

The New
PICTURED ENCYCLOPEDIA
Volume Five



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KEY TO COLOUR PLATE

GRASSES AND SEDGES

Many people think that there is little difference between the various sorts of grasses. This is wrong of course and it is equally a mistake to think that their flowers are not as distinct as are those of the other flowering plants. In the colour plate overleaf, to which this is a key you see a few of the beautiful grasses and sedges found in various parts of the British Isles. Their names are as follows:

| | | |
|----------------------|---------------------|------------------------|
| 1 Barnyard Grass | 2, Hairy Brome | 3 Couch Grass |
| 4 Meadow Foxtail | 5 Carnation Grass | 6, Ribbon Grass |
| 7, Field Woodrush | 8 Canary Grass | 9 Common Quaking Grass |
| 10 Cock's Foot Grass | 11 Giant Bent Grass | 12 Common Reed |

SOME BEAUTIFUL BRITISH GRASSES AND SEDGES



Here are some of the beautiful grasses of all shapes, sizes and colours that you may see when you are wandering in the countryside in summertime. They are shown in their full maturity. At the back of this plate is a key which will enable you to identify them.

Painted by FRANK R. HINKINS

✓ THE NEW PICTURED ENCYCLOPEDIA

A Pictorial Treasury of Reading
& Reference for Young and Old

Edited by
SIR JOHN HAMMERTON

Editor, Universal Encyclopedia, Universal History of the World, Peoples of All Nations
Countries of the World Encyclopedia of Modern Knowledge. New Popular Educator

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VOLUME FIVE GRAS—KYO

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HERE AND THERE IN THIS VOLUME

At odd times when you are just looking for "something interesting to read," without any special plan in mind, this list will help you. With this as a guide, you may wander through storyland, visit far-away countries, meet famous people of ancient and modern times, review history's most memorable incidents, explore the marvels of Nature and science, play games—in short, find whatever suits your fancy at the moment. This list is not intended to serve as a table of contents, an index, or a study-guide. For these turn to the Fact-Index and Study Outlines in Volume Ten.

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CAN YOU ANSWER THESE QUESTIONS?

Since unnumbered thousands of questions are answered in each one of our ten volumes, this page is intended merely as a sample of the pleasure and instruction that may be obtained by discovering interesting facts in this volume and passing them on to others in question form. There are many thousands more for you to draw upon as tests in General Knowledge

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WHEN YOU ARE IN NEED OF READY REFERENCE

In using THE NEW PICTURED ENCYCLOPEDIA as a work of reference, Volume Ten is indispensable. As regards its contents that particular volume is unique for it is at once a complete Index to the preceding Nine Volumes and an Encyclopedia in itself. Its purpose is fourfold as indicated below.

(1) **Through the Year with the N P E** Its opening section takes the form of a Calendar of the Year, giving for each day all the chief events and matters of interest with references to the pages of THE NEW PICTURED ENCYCLOPEDIA in which full particulars concerning the event, personality or other interest of the day may be found. By the intelligent use of this section (a) the young reader can have the daily delight of reading about topics that have special association with the particular day of the year on which he may be making his reference, (b) father or mother can suggest what would be the most appropriate reading for the day, and (c) the school teacher can set the lessons for the day with a genuine topical appeal.

(2) **Study Outlines** This large and important section of the volume provides a simple method of study which should enable any of our young readers to become expert in using THE NEW PICTURED ENCYCLOPEDIA as an auxiliary manual of home study and thus what is learnt in school may be amplified and more securely fixed in the memory.

(3) **The Fact Index** Actually this is in itself a complete Encyclopedia. In addition to providing many thousands of references to contents of Volumes One to

Nine, it records many more thousands of facts in biography, geography, history, science, the arts, etc that are not mentioned in its nine predecessors. Therefore, if you look in vain for any subject in the alphabetical order of Volumes One to Nine, turn to Volume Ten and you will almost certainly find it there.

It is a good plan when using THE NEW PICTURED ENCYCLOPEDIA as a work of reference always first to look up any subject in the Fact-Index of Volume Ten.

(4) **Thousands of Additional Entries** Not only are all the many thousands of statements of fact that appear in the main body of the work carefully recorded in the Fact-Index for your immediate reference but many thousands of additional entries are given in this exceedingly useful section of our work. By this method the reading pages of the work are saved from the burden of thousands of brief cross references which the ordinary encyclopedic method would involve. These new entries in the Fact-Index together with the treasure of reading embodied in Volumes One to Nine make THE NEW PICTURED ENCYCLOPEDIA the most comprehensive encyclopedic work produced in the present generation and assuredly the most readable encyclopedia of its kind.

KEY TO PRONUNCIATION

Most of the subject headings in THE NEW PICTURED ENCYCLOPEDIA require no special indication of the way in which they should be pronounced. There are also many for whose proper pronunciation it is only necessary to know which syllable is stressed, in these cases the stress is shown *after* the syllable, thus A'jax. Where further guidance is necessary, the following signs are employed

ah = a as in father

aw = a as in ball

ê = vowel sound in fern, word, girl,
curl

ow = vowel sound in now, bout

oi = vowel sound in noise, boy

Unmarked vowels have their short
sound, as a in hat, e in bet,
i in bit, o in not, u in but,
oo in book

Marked vowels have their long
sound, as in hâte, bê, bîte,
nôte, tûne, bōon

Vowels in italics have a slurred or
obscure sound as in abet
(a bet'), recent (rē sent),
conform (kon-form'), nation
(nā'shun), tailor (tā'-lor)

th = first sound in thing, thank

th = first sound in the, that

zh = s in measure, leisure

g = hard g, as in good, girl

j = soft g, as in gem, ginger

kh = guttural in loch

LIST OF ABBREVIATIONS

The abbreviations most commonly used in this work are noted below. A much longer list of abbreviations often met with in reading or conversation is given in the Fact Index that is contained in Volume Ten.

A D, *Anno Domini* (in the year of our
Lord, of the Christian era)

a m, *ante meridiem* (before noon)

b, born

B C, before Christ

C, Centigrade

c, *circa* (about)

Co, county, company

d, died

e g, *exempli gratia* (for example)

etc, *et cetera* (and so forth)

et seq, *et sequens* (and following)

F, Fahrenheit

h p, horse-power

i e, *id est* (that is)

lb, pound, pounds (weight)

m, miles

MS, MSS, manuscript, manuscripts

oz, ounce, ounces

p m, *post meridiem* (after noon)

Pop, population

Pron, pronunciation

q v, *quod vide* (which see)

sq m, square miles

St, Saint

U S A, United States of America

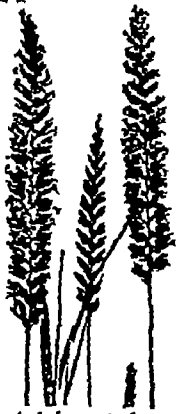
viz, *videlicet* (namely)

yd, yard

The GRASSY CARPET of the EARTH

No garden is complete without its patch of lawn, and what would our countryside be without its expanses of green fields? Lovely indeed is grass, and exceedingly useful are the members of the great grass family

Grass. Wild and cultivated grasses contribute so largely to the needs of human and animal life that it is no exaggeration to say that this is the most important of all families in the plant kingdom. A large portion of our food is provided by cultivated "grasses" — wheat, oats, rye, barley, rice, maize, millet, and sugarcane, from grasslands in the ordinary sense come indirectly our beef and mutton, hides and wool, and many articles of commerce.



Crested dog s-tail grass.

Grasses are the most widely distributed of all plants. Pygmy grasses, moss like grasses not over 2 inches high, cling close to the cold ground right up to the borders of the Arctic ice and snow fields, small and middle sized grasses grow in great luxuriance in the north temperate

zone, increasing the total of the family to over 4,000 species, and there are the huge bamboos and other tropical types. Grasses grow, or can be made to grow, on all kinds of soil, and in all sorts of conditions. They thrive on the banks of streams, along the sandy seashore, in the low wet marshlands, on the sunny meadows, or in the shade of woodland and orchard.

The grasses can boast of long ancestry, for they belong to one of the first families of the vegetable kingdom. Moreover, they have always been among the first of plants to cover waste or barren ground and reclaim a neglected roadway or field.

One of the most important things grasses do is to bind down the soil until plants of larger

and slower growth can establish themselves, and even then the grasses protect the roots of trees, and our fences, roads, and buildings, by forming a thick enduring carpet which prevents the wind and rain from carrying away their soil foundation or from blotting them out and burying them under shifting sands. Today large areas in Canada and the U.S.A. are denuded of subsoil through failure to appreciate this protective binding character of grasses. In winter the grasses, changed from their beautiful green to colours of gold and brown, give protection to the seeds and tender bulbs during their long sleep under the snow, while, dying down and rotting away, they keep the soil rich and well supplied with valuable food for other plants.

The great natural pasture lands of the world are the steppes of Russia, the pampas of South America, the vast plains of America, and the wide ranges or "runs" of Australia. Practically every farm has its pasture land, and the reason is easily understood, for in fattening cattle, grass or hay is only about one fourth or one fifth as costly as grain fodder.

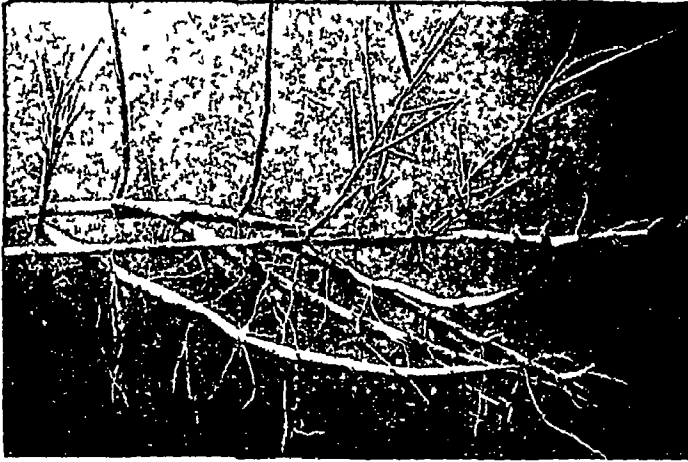
The introduction of grass drying plants, whereby the protein value of fresh grass is fully retained, at the same time permitting (in England) of four or more mowings per year, is one of the greatest advances of modern agriculture. It makes the English live-stock farmer less dependent on imported feeding stuffs and oil-cake and less at the mercy of changing world prices for fodder. Thus stabilization of production costs must ultimately benefit the consumer.

Grasslands of greatest perfection are lawns, especially the lawns of England and other old countries where they have been rolled, trimmed, and regularly watered for centuries. Lawn or pasture



TWO COMMON GRASSES H. Bastin

The fox-tail grass is easy to distinguish, for its flowering spike is not like that of any other grass, the furry look is due to the opening of the anthers. The other grass here is the wild oat, also simple to recognize for it looks just like real, cultivated oats.



HOW GRASS GRIPS THE SOIL

When grasses such as that seen above are weeds in the garden, we hate their tenacious, straggling roots, but when, as is usually the case with this one, the lime-grass, they are used to keep shifting sands in place, they are of great value to Man, preparing the soil for more useful vegetation

grasses have leaves that grow constantly from their bases, so that when they are grazed or clipped they quickly grow up again. There are a number of ornamental grasses such as the ribbon-grasses, plume grass, Ravenna grass, and, of course, the tall, plumed alfalfa or lucerne grass.

Grasses are well fitted for making their own way in the world, and if for any reason they are not wanted they can become a most persistent weed. They are rapid growers, the larger species growing 2 or 3 feet and even more in 24 hours, while the 100-foot bamboos grow in from two to three months' time. Another special advantage which many of the grasses have is a peculiar structure of their leaves which protects them from drought. Thin-walled cells between the veins of the leaves keep them expanded under normal conditions, but roll them up to prevent evaporation while drought and hot winds threaten. Grass has been called the commonest and most beneficent plant which grows on earth.

The botanical name of the grass family is the *Gramineae*. The chief characteristics are the jointed stems, with leaves arranged in two opposite rows, a single leaf at each joint of the stem. The stems are hollow, except in a few varieties which have stems filled with soft pith. The flowers are enclosed in glumes, or chaff-like scales, and are arranged in spikes like the wheat-heads, or in panicles like the oat. The classification of grasses is determined according to the arrangement of the actual parts of the flower system.

Grasshopper. If a boy could jump as far, in proportion to his size, as a grasshopper, he could

easily spring to the roof of an eight storied building, or jump from pavement to pavement of the widest London street. If he could make as much noise, in proportion to his size, as a grasshopper, the ground would tremble with the sound, and if he could eat as much and as fast as a grasshopper, he would devour more than his own weight of food in a day. It is because of the rapidity with which they breed, and the immensity of their appetite, that the kind of grasshoppers called "locusts" are a plague to Man.

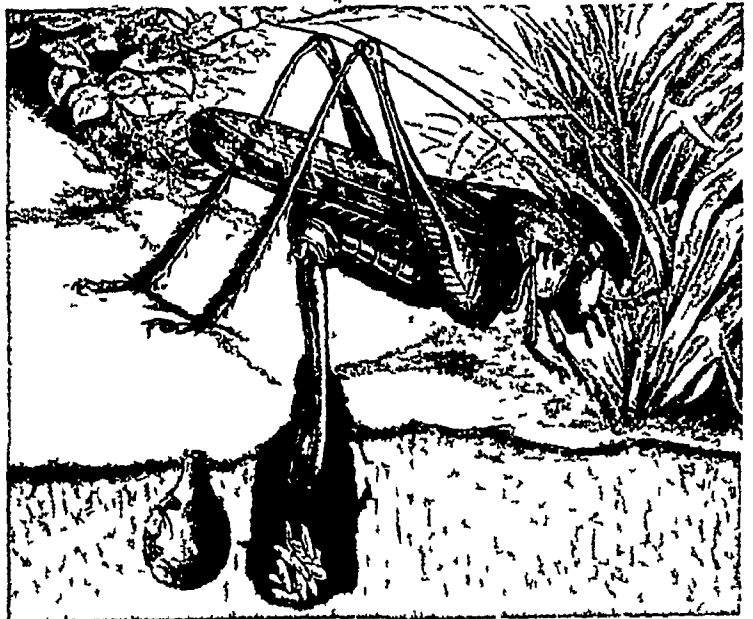
The grasshopper, whatever its species, has a helmet-shaped head, and strong jaws with which it tears big pieces out of leaves or plant stems. The front wings, which are tough and hard, lie straight along the back, protecting the tender film of the back wings, which do

most of the flying—for if you watch one of these insects hop, you will see that it often opens its wings, and flies to lengthen its leap. But some forms are wingless, and must hop with their legs alone. The young "nymphs," too, which otherwise resemble their parents, have the wings undeveloped, and they too are "hoppers."

The reason the grasshopper cannot "sing" while you are holding it is that its sound-producing organ consists of an arrangement of pegs on one front wing, and a "sounding board" on the other, if you hold the wings so that it cannot rub them together, it is dumb.

Its ears are on its front legs, below the first joint.

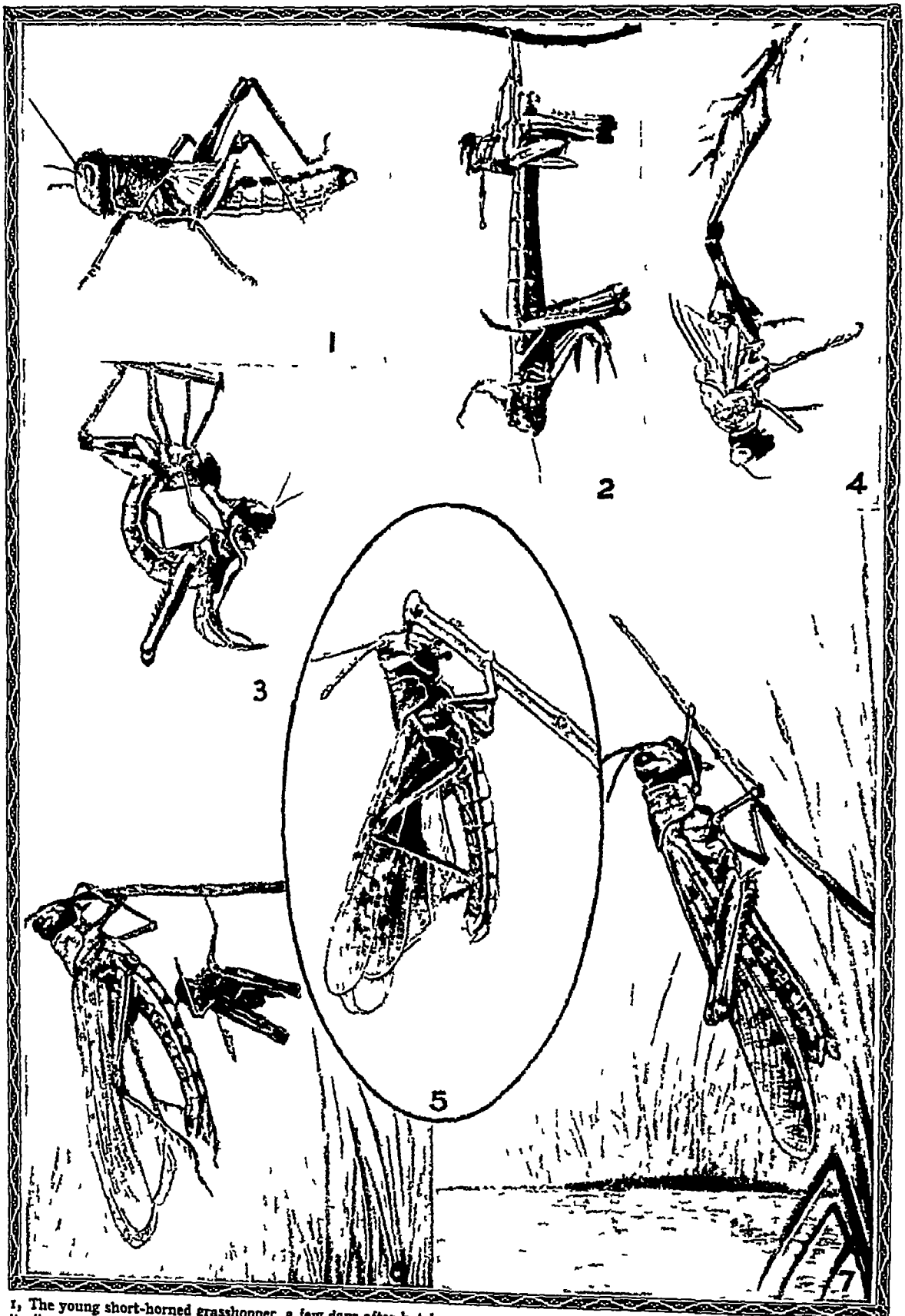
Now imagine a grasshopper about four inches long, with legs, jaws, and wings in proportion,



MRS GRASSHOPPER LAYS HER EGGS

This is a long-horned grasshopper, whose long antennae and ovipositor distinguish her at once from a locust, or the short-horned form. Here she has drilled holes with the ovipositor, and is now using it to lay her eggs. Those on the left have hatched and the tiny grasshoppers are crawling out of the hole.

HOW THE GRASSHOPPER GETS ITS WINGS



1, The young short-horned grasshopper, a few days after hatching, its wings folded inside little cases on its back. 2, Shedding its "nymph" skin. 3, Almost out of the shell. 4, The old shell left hanging to a twig. 5 and 6, The grasshopper drying and smoothing out its wings. 7, Resting after its first trial flight.

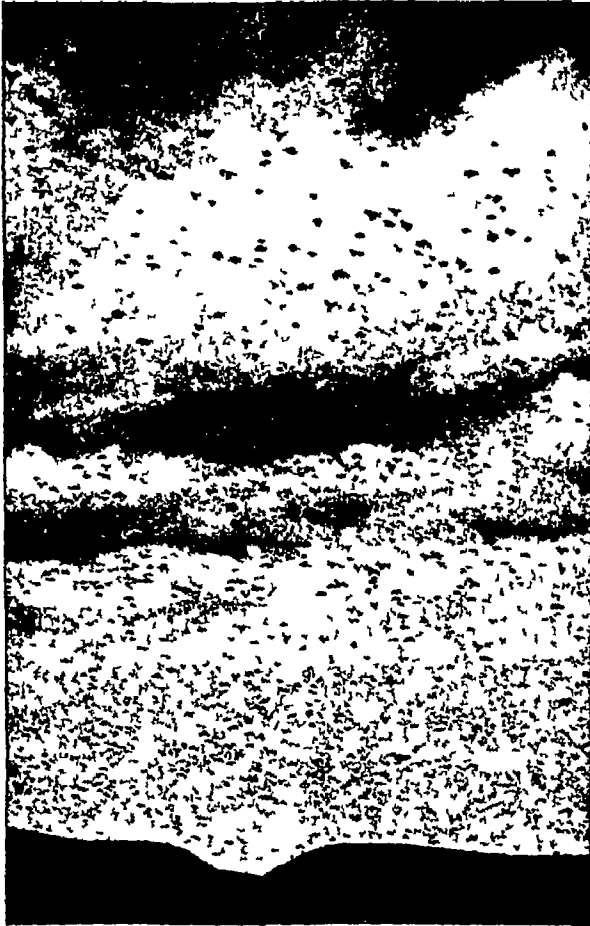
GRASSHOPPER



LOCUSTS COVER THE LAND

A swarm of locusts is one of the worst evils that can befall a farmer of Asia or Africa, for when he sees the sky darkened with their flying thousands, as in the photograph on the left, he knows that nothing can save his crops from utter destruction. The picture above shows a field of wheat, covered as with a carpet, by this hungry plague, literally mowing down the grain with their millions of jaws. The left-hand picture was taken in Palestine, near Jerusalem, that at the

top in the Transvaal, South Africa
Left American Colony Jerusalem



"ten plagues" of Egypt, told of in the Bible, and in spite of all Man can do, locust swarms are just as harmful today.

It is impossible to give an idea of the millions of locusts which compose these swarms. A cloud appears on the horizon like a black storm, it spreads until the light of the sun dies out, it settles down like a vast blanket, burying everything in sight, blotting out the landscape, for mile upon mile there is nothing but a sea of locusts. Then the fatal march of the insect army begins. Before it stretch green fields, the dense army moves forward, and the green fields vanish. Behind the locusts, the ground looks as if it had been swept clean with a vast broom—not a blade of grass is left. A river bars the way. The front ranks cast themselves upon the water, clinging together, pile upon pile, until a bridge of living insects is formed, and the rear ranks march forward over them.

There is mystery in these swarms, but it is gradually being unravelled. They do not come every year, nor do they always attack the same region, but in each part of the world certain breeding grounds are known. In them is a permanent population of green, solitary locusts. When numbers increase, young "hoppers," seeing others, hop with them in the same direction. Gathering others, the swarm begins, and the hoppers, no longer solitary, change to

and you will realize what the dreaded locust of Asia and Africa is like. This name "locust" is often wrongly given to the cicada, and to other swarm insects, but it properly belongs only to grasshoppers of the family *Acrididae*, and not, curiously enough, those of the *Locustidae*.

A swarm of locusts, which devoured the grain and left famine in its wake, was one of the

GRASSHOPPER

reddish or brownish black Still hopping, still increasing in numbers, they grow up, and then the whole swarm takes to the wing, flying until, with strength exhausted, it descends to ruin the crops and vegetation Scientists make a distinction between the "long-horned" and the "short-horned" types of grasshopper

The swarm locusts just described belong to the short-horned group, which includes also many common British species The great green grasshopper, however, has long thread-like feelers, and belongs to the long-horned group The short-horned grasshoppers are also distinguished by having the noise-making apparatus between the hind legs and the wings, and the ears on the sides of the stomach, just behind the chest or thorax

Grasshoppers usually lay their eggs in holes which the females bore in the ground When the young hatch, they look like tiny awkward models of their parents, except that their wings do not develop for some time Their appetite, however, is large, and they start at once their destructive feeding Closely related to the grasshoppers, too, are the crickets, and together with the cockroach group, these form the insect order called *Orthoptera*

Grass Snake. There is never any need to be alarmed when meeting with a grass snake, *Tropidonotus natrix*, for he is not at all poisonous If alarmed by your suddenly disturbing him,

The FORCE that BINDS the UNIVERSE

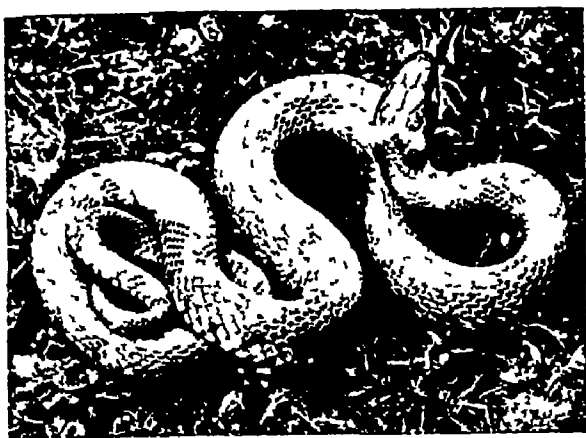
Have you ever wondered what force stops you flying off the earth into space, when you jump off its surface? Or what power keeps the earth in its regular course round the sun? Here is the answer

Gravitation. From the beginning of time, a very remarkable thing has been happening, and few except very little children and very great philosophers have thought to ask why That is, things have invariably been falling to the ground, and never in any other direction Everything on the earth tends to fall, or to seek a lower position, unless held up by something beneath it Even balloons and corks are not the exception that they seem to be The force which causes bodies to act in this way we call "gravitation"

But is gravitation a mere local affair? What about other worlds than ours? More than 250 years ago a young man named Isaac Newton was sitting in an English garden, wondering what the power is that keeps the moon for ever swinging in its orbit round the earth, like a ball at the end of a string kept whirling round

Seeing an apple fall from a tree, he asked himself (so runs the story) if the same force, which is so irresistible and so all pervasive on earth, might perhaps be the force that keeps the moon in its orbit by constantly pulling it towards the

GRAVITATION



THIS SNAKE IS HARMLESS

From this photo you may learn just how to tell the grass snake. Its back is devoid of markings, and there is a yellow ring behind its head, hence the alternative name, ringed snake.

Photo John Kearlton

he will hiss at you and perhaps strike at you with his head, but this will be all that he will do in the way of self-defence

Grass snakes are often encountered in England, and they are widely distributed over Europe, North Africa, and Asia You can tell them by their bands of black and their spots, and also by the upper colouring of olive grey or brown, and the underneath colouring of black and white, as well as by the yellow ring round the head (hence their other name, ringed snake) They are from 3 to 6 feet long

earth Might not terrestrial gravitation be only one manifestation of a great universal Law of Gravitation, ruling not merely the fall of terrestrial things, but all motion in the universe—even the stately progress of the planets round the sun and of other stellar systems, out to the uttermost bounds of space?

Now Isaac Newton was not the first man to whom such an idea had occurred The great mathematician and astronomer Ptolemy of Alexandria had surmised something of the kind in the 2nd century A D, and others since that time had had vague ideas of the existence of the great and splendid force divined by Newton It is a long way, however, from vague surmises to sound scientific theory based on proof, but the materials for such proof had been accumulating from Ptolemy's time to Newton's

Newton attempted to put his theory to the test of calculation, but his results did not agree with the moon's observed course, and he set aside the idea for years At length more accurate figures were obtained for the distance of the moon from the earth, and when these figures

GRAVITATION

were used, the calculation of the action of gravitation on the moon was found to agree exactly with the moon's course, and similar calculations applied to the other heavenly bodies completed the sequence of evidence. The general theory of a Law of Gravitation was proved. Certain modifications, resulting from Einstein's later theory, have not greatly altered Newton's original conception of the mysterious force we call gravitation.

The great law of gravitation which Newton thus established is that *"every mass of matter attracts every other mass of matter with a force which varies directly as the product of their masses and inversely as the square of the distances between them"*

Observe, the attraction is mutual, if the earth attracts the grain of sand, the grain of sand, equally in proportion to its mass, attracts the earth. So the planets pull the sun while the sun pulls them. This relation of the pulling power of gravitation to mass implies some rather surprising things with regard to conditions on the other planets, which may be found in the article on Planets.

The most important step in the study of gravitation on the earth, before Newton formulated his law of its universal action, had been taken about a century earlier. For nearly 2,000 years men had been repeating the dictum of the great Aristotle, that heavy objects fall more swiftly than light ones, and that the rate of speed is in proportion to the weight of the object. Not until the end of the 16th century was anyone so impertinent as to try to find out whether Aristotle could have been mistaken.

Then an inquisitive young man named Galileo (*g v*) climbed the Leaning Tower of Pisa, and dropped from the top two objects of different weights. They struck the ground at the



GALILEO DEMONSTRATES GRAVITATION

Will a heavy object fall faster than a light one? There are still probably a good many people who would answer confidently, "Of course, a heavy object will fall faster." That's what the world thought until Galileo climbed the Leaning Tower at Pisa, Italy, and made his famous experiments. He chose this tower, not only because it was high, but because he could drop things without them hitting the sides of the building on the way down. Here we see him just about to let fall two iron balls, one much bigger than the other. They both hit the ground at exactly the same time.

distances traversed by any falling body, from the beginning of its fall to any two or more points during the fall, are to each other as the squares of the times in falling.

That is why you can fall from a chair to the floor without hurting yourself much, while, if you were to fall from the roof or upper window of a high building, you might break most of your bones. When you strike the floor in falling from the chair, you are still moving comparatively slowly, while by the time you strike the ground in falling from the roof, you are moving with great speed. This is also why it is so much more dangerous to be struck by a brick or a stone dropped from a great height than by one which has fallen only a short distance.

The strength of the earth's pull on each object is the weight of that object, and since the strength of the pull diminishes as the distance increases, the weight of the same object varies at different points on the earth's surface. If you were to

same time! And great was the dismay thus created among the local wise men, who wanted to know what the world was coming to, if a mere nobody were to be allowed to dispute the word of the great Aristotle!

But Galileo experimented further, and found out that falling bodies constantly acquire more speed the farther they fall. An apple falling from the bough of a tree 16 feet above the ground strikes the ground in one second, and one dropped from a tower window 64 feet high strikes the ground in two seconds. In other words, a falling body drops 16 feet in the first second, 48 in the next, and 80 in the third—or 144 feet in the first three seconds. Every second that a body falls, it gains 32 feet per second over the speed it had the second before. Otherwise stated, the Law of Falling Bodies is that the

HOW A LITTLE APPLE STARTED A BIG IDEA



It was one of the greatest days in the history of science, according to Voltaire's famous story, when Sir Isaac Newton, sitting in his garden in Lincolnshire, noticed an apple fall to the ground and asked himself, "Why?" As he pondered this question, the great scientist conceived the idea from which he developed the Law of Gravitation. This "apple story," although it is now generally discredited, was long accepted as fact.

GRAVITATION

weigh five pounds of lead—or wood, or cotton, or anything—carefully on a spring balance at one of the poles, and then take it to the equator and weigh it again on the same scales, you would see it stretch the spring a very little bit less, because it is farther away from the centre of the earth. Likewise, you would find that the same object weighs less on a high mountain-top than at sea-level, the difference being about $\frac{1}{2000}$ of the weight for every two miles of elevation.

Furthermore, the weight of an object is in proportion to its mass, that is, the amount of matter it contains. Two lead balls of the same size would not weigh the same, of course, if

pared with water, is called the “specific gravity” of that substance. The specific gravity of gold is 19.3, that of silver, 10.5. That is, gold is 19.3 times as heavy as water, silver only 10.5 times. So, if Archimedes found the specific gravity of the king’s crown to be less than 19.3, he was confirmed in his conclusion that the goldsmith had not made it of pure gold alone.

Another important division of this subject has to do with the “centre of gravity” of solids. The centre of gravity of any object is the centre of its mass or weight. In a symmetrically shaped object of the same density throughout, the centre of gravity will be at the geometrical

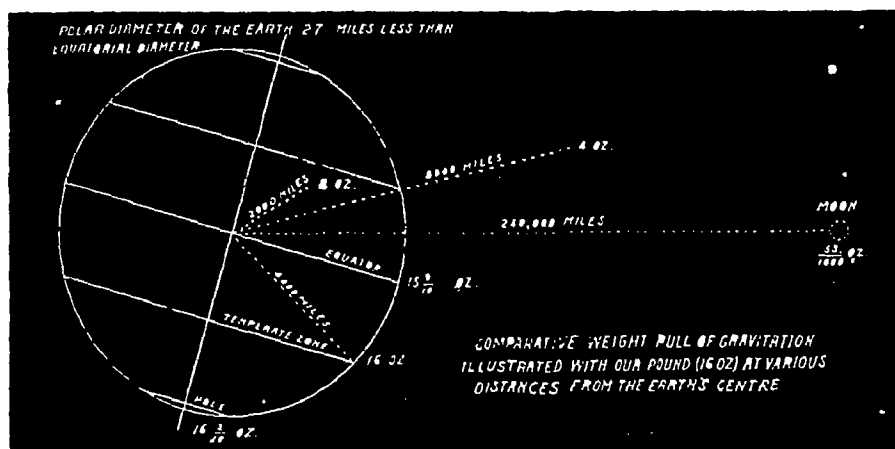
centre. If the centre of gravity is “supported,” that object is in equilibrium and will not fall. This is the case with the Leaning Tower of Pisa, from which Galileo made his experiments. The tower stands safely, but if you want to know what would happen if it were to be built higher, try building a leaning tower of blocks. It stands so long as the centre of gravity is over the base, but when the tower is carried up so that the centre of gravity is no longer over the base, over goes it.

The tight-rope performer has learned by long experience to keep the centre of gravity of

his body directly over his base of support, the wire. Of course, the narrower the base the more difficult it is to keep the centre of gravity exactly over it. This is why it is harder to balance a pencil upon its point than upon its blunt end. It is easier for a baby to crawl than to walk, because when he is on all fours his centre of gravity is carried over a broader base than when he is standing on his feet.

From the beginning of life to the end, we are playing a game with the force of gravity. The baby trying to carry a spoonful of bread and milk to his mouth without spilling it, or to balance himself on his two little legs, is just learning to play this game. So are the architect and the engineer, each using all his knowledge of mathematics and physics in the construction of buildings, bridges, and railways. So also is the aviator, whether he flies straight forwardly or performs the most daring feats.

What has been explained here is but the beginning of a glimpse into the known facts of



HOW GRAVITY'S 'PULL' AFFECTS WEIGHT

This diagram shows how the pull of gravity varies at different distances from the earth's centre. The unit of comparison is 16 ounces (one pound) weighed in the temperate zone. The general law is that the farther the object is from the centre of the earth, the less it weighs. Because the earth bulges a little round the middle and is flattened at the ends, the pound will lose weight as you move it toward the equator, and gain weight as you move it toward the Poles. If the pound were taken to the moon, the earth's pull upon it would be only a fraction of an ounce. At a depth of 2,000 miles in the earth, the pound would weigh only eight ounces. This seems to violate the law about "the nearer the centre, the greater the pull." But remember that now the 2,000 miles of earth above our pound weight would be tending to pull it upward, thus acting against a part of the downward pull.

one were solid and the other hollow. A block of wood weighs less than a block of lead of the same size for a similar reason, namely, that the particles of matter in the wood are not so closely packed as the particles of matter in the lead. In other words, lead is denser than wood.

It is important to have a measure of density—of the closeness with which matter is packed—to know, in short, the “specific” density or gravity, as it is called, of different substances. It was Archimedes who first showed us how to find this. Having noticed that any object suspended in water seems lighter than when in air, he tried weighing various substances in air and water. Thus he discovered and enunciated the law “that a body totally immersed in water loses weight equal to the weight of the volume of water which it displaces.”

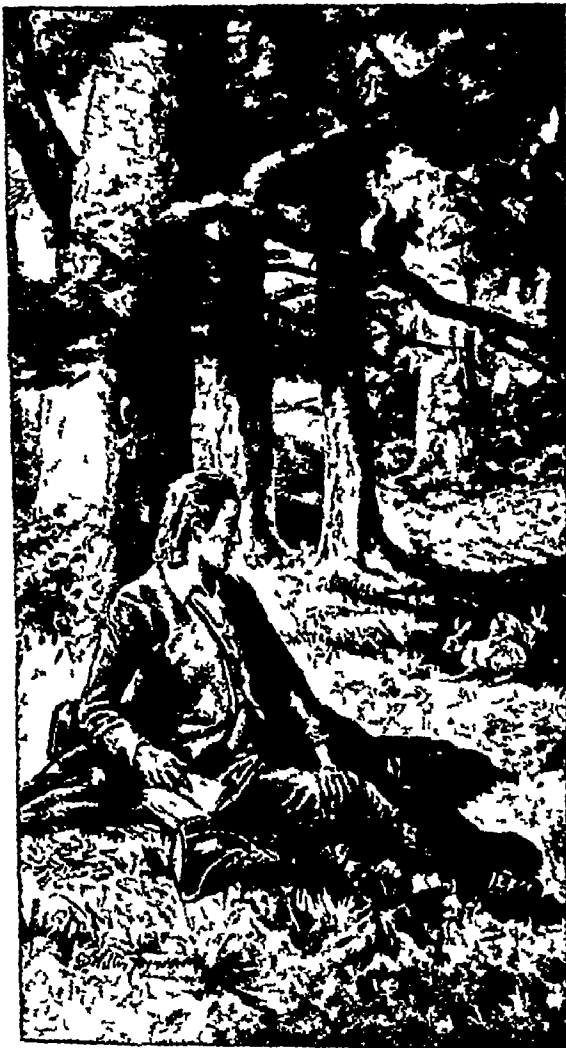
If a substance is weighed first in air, then in water, and the weight in air is divided by the loss of weight in water, the result, which expresses the density of that substance as com-

GRAVITATION

this great law, and do not imagine that everything about it is known even yet. From one point of view it seems very simple—the most sweeping and unconditional generalization yet made in regard to the workings of the universe. But neither Newton nor, since Newton's time, anyone else has yet shown the nature of the force which operates through this law.

In the view of Albert Einstein, the "attractive force" suggested by Newton can be replaced by certain other properties of "space," expressible only in highly complex mathematical terms (See Einstein, Albert).

Gray, THOMAS (1716–1771) Gray's most famous poem, the "Elegy Written in a Country Churchyard," was published at sixpence in 1751, and a copy of the original edition has since been sold for over £900. Made familiar by many quotations, it is one of the most beautiful and



GRAY AMONGST THE TREES

Thomas Gray was one of the forerunners of the Romantic Revival in English literature—one of the first to reintroduce themes from Nature in his works. Here he is seen in the woods at Burnham, Bucks, looking up from his beloved Virgil in a "green lane of forest all his own" at the "timorous hare and sporting squirrel."

GREAT BRITAIN

exquisitely finished poems ever written. The quantity of Gray's poetical work is small, but the quality is such that poems like his "Elegy" are enshrined in English literature for all time. Also, his letters are among the best in the language, charged with sympathy and humour.

Thomas Gray was born in Cornhill, London, December 26, 1716, and was educated at Eton. After a tour of the Continent he returned to Cambridge in 1742 to resume the classical studies he loved, and Cambridge he made his home, save for brief intervals, for the rest of his life. He became professor of modern history there in 1768, and there he died July 30, 1771.

Apart from translations from the classics, Gray's first poem was the "Ode to Spring," which was followed by the "Ode on a Distant Prospect of Eton College" and the "Hymn to Adversity," all of which belong to the year 1742. The "Ode on the Death of a Favourite Cat" appeared in 1747, the cat in question belonged to his old friend, Horace Walpole. After his father's death his mother had retired to Stoke Poges, and in 1750 came the famous "Elegy," which was inspired by the churchyard at Stoke Poges, where his mother and another son were buried. There is a monument to Gray in a field adjoining Stoke Poges churchyard, and also one in Westminster Abbey, and the house in Cornhill where he was born is marked by a tablet.

Great Britain. The "tight little island" of Great Britain is separated from France by a strip of water only 21 miles wide at its narrowest point. But the rough waters of the English Channel, the North Sea, Irish Sea, and St. George's Channel, which surround it, shut the people of Great Britain away from their enemies in the days of their weakness, and when they grew strong the sea furnished them with broad highways by which they might carry on trade and commerce with other nations.

This little island—about two fifths the size of France—which stands at the western door of Europe, has been favoured by Nature in many ways. It has an excellent climate, neither very cold in winter nor very hot in summer, and with an abundance of rainfall. Its broad, deep rivers—the Thames, Severn, Humber, Mersey and Clyde—admit ships a considerable distance into the interior. On its fertile soil can be grown most crops of the temperate zone. And in its mountainous regions of the north and west are to be found valuable deposits of coal and iron, essential for her heavy industries.

In her 88,745 square miles there is almost every variety of land.

Before 1707 Great Britain was merely a geographical name. The chief country in the island was England, to which Wales had been added by conquest in 1282, and to the north was the separate kingdom of Scotland. Since James VI

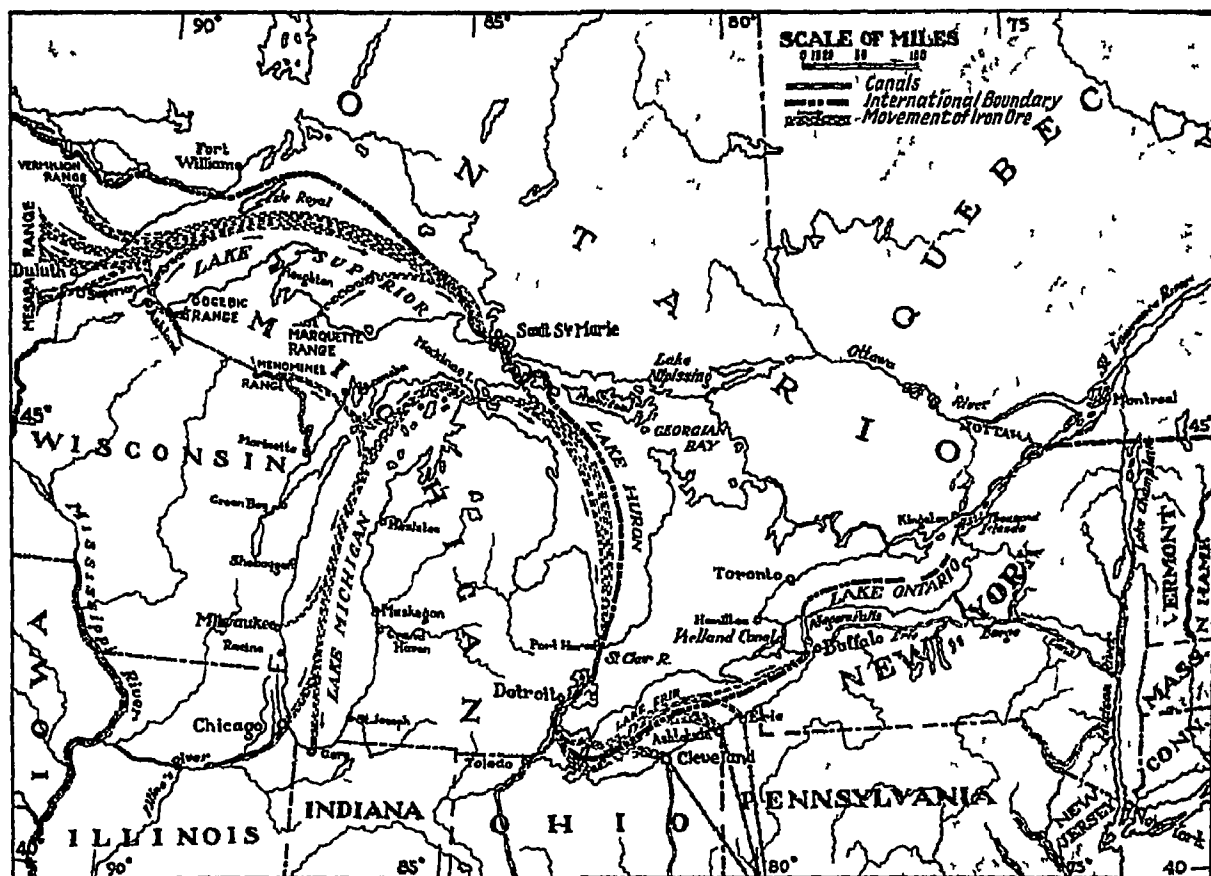
of Scotland had ascended the English throne in 1603 as James I of England, the two countries had always had the same ruler

But it has only been since the Act of Union of 1707 that the two countries have been united under the name of Great Britain. In 1801 another Act of Union brought Ireland under the same Parliament with Great Britain, and the official name was changed to the "United Kingdom of Great Britain and Ireland." Over a hundred years later, in January, 1922, Southern Ireland was given dominion status as the Irish Free State, while Northern Ireland remained part of the United Kingdom. In this government are included also the other British Isles—the Hebrides, Orkneys, Shetlands, the Isle of Wight, the Isle of Man and the Channel Islands.

The union of Scotland, Ireland, and England is shown by the flag of Great Britain. Before the first Act of Union the flag of England was white, with a large upright red cross, that of Scotland was blue, with a diagonal white cross, and one of the emblems of Ireland was a red diagonal cross. In the modern "Union Jack" all three of the crosses are united in a single emblem. (See also Britain, British Empire, British Isles, England, Ireland, Scotland, Wales)

Great Lakes. There is no other system of inland waterways that compares with the large lakes—Superior, Michigan, Huron, Erie, and Ontario—that lie along the boundary between the United States and Canada. These inland seas cover an area of nearly 100,000 square miles, and the thousand or more streams that feed them drain an area of about 288,000 square miles. So vast are they that their storms are like ocean storms, and they have an oceanic effect upon the climate, absorbing heat in summer and giving it out in winter, thus tempering the extremes of climate that would otherwise be experienced along their shores.

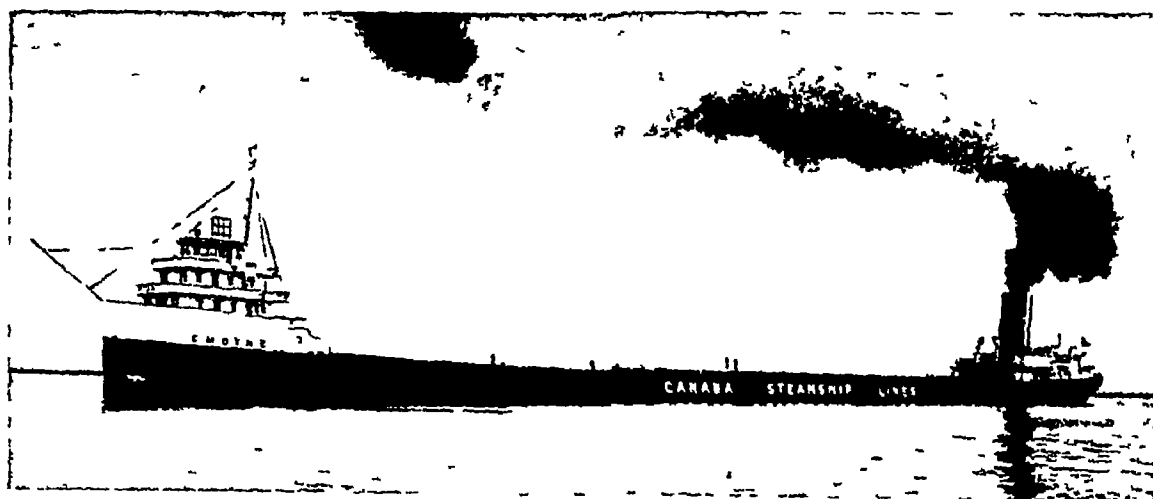
Varying in depth from 1,180 feet in Lake Superior to 210 feet in Lake Erie, the lakes are open to navigation by large vessels from end to end. You may take a steamer the size of an ocean liner at Buffalo and sail away for a thousand miles to Duluth or Chicago, nearly half the length of the Mediterranean. On smaller craft you may voyage farther still, while vessels of 14-feet draught can pass round Niagara Falls by the Welland Canal and down through Lake Ontario and the St. Lawrence River to the Gulf of St. Lawrence and the ocean. Projects have long been on foot to deepen both these routes to



THE TRAIL OF COMMERCE THROUGH THE GREAT LAKES

Here are the five lakes which are among the busiest bodies of water in the world. The heavy broken line shows how the boundary between Canada and the United States divides them. The light lines show the lanes followed by the iron-ore traffic. This traffic alone maintains a string of steamers scarcely out of sight of each other's smoke all along these lanes, and when you remember that iron ore is only one of many commodities carried on the Lakes, you can understand how important they are in North America's life. Note the canals connecting the Lakes with the important rivers to the south and east.

GREAT LAKES



GRAIN SHIP THAT PLIES ON THE GREAT LAKES

This odd-looking vessel, S S Lemoyne, 633 feet in length, is a ship specially built for carrying the grain of Canada from the western prairies through the Great Lakes to the ports of the east. She has a gross tonnage of 10,000 tons and she holds the world's record for volume of grain carried, being able to transport 550,000 bushels in a single cargo. Quite a long telephone cable is needed on her from the bridge to the engine-room two hundred yards aft!

Courtesy of the Canadian Govt

the Atlantic Ocean, so that deep sea steamers of 30 feet draught may ply between lake ports and foreign cities, thus saving the expense of transshipping cargoes from lake to ocean vessels.

From December or January until April the lakes are in large part ice-bound, and vessels lie idle in the inland harbours of Toronto, Cleveland, Buffalo, and other ports. Terrific storms mark the end of the navigation season, and the cargo vessel that ventures out for one last trip is sometimes never heard of again, or perhaps hobbles into port coated with ice, and with hundreds of rivets shaken out by the buffeting of giant waves. Whitefish Bay, at the east end of Lake Superior, is known as "the Graveyard of Ships," from the many wrecks there.

The importance of these great waterways to the prosperity of the United States and Canada cannot be over-estimated.

Without the cheap transportation which the lakes afford, the development of the Canadian prairies would have been far slower. Such Canadian ports as Montreal (on the St. Lawrence), Fort William, Hamilton, Toronto, and Kingston have all thrived in recent years. More vessels enter and clear at Chicago than at any other port of the United States, excepting only New York. A greater tonnage passes through the Detroit River in the seven or eight months of navigation than that which enters and clears at all the Atlantic and Pacific ports of the U.S.A. in a year. The lake fisheries are the greatest inland fisheries in the world.

There has been a canal with locks on the American side of Sault Sainte Marie since 1855, to pass round the rushing rapids (*sault*) where the St. Mary's River issues from Lake Superior. Today there are two great series of locks. One of the locks in the American canal (completed in 1919) is 350 feet longer than the locks

of the Panama Canal, and the Canadian locks also are of great size. Here is such a scene of activity as few of the world's great waterways can show. Great barges and passenger steamers go through at the rate of one every 12 minutes.

The history of the Great Lakes dates back nearly 300 years. The French discovered Lake Ontario in 1611, and four years later Champlain discovered Lake Huron. Lake Erie was the last (1669) to be reached by white men, owing to the hostility of the Iroquois tribes. The first sailing vessel on the lakes was La Salle's *Le Griffon*, of 40 or 50 tons, launched on the Niagara River in 1679. The first steamboat appeared on Lake Ontario in 1817. The opening of the Erie Canal in 1825 started emigration westward by canal and lake, and by 1833 there were 11 steamboats on the lakes making a trip or two each season from Buffalo to Chicago. Today, the great passenger steamers are the safest and most comfortable means of travel during the navigation season between many points on the lakes. Government charts of the lakes showing light-houses, lightships, buoys, and life saving stations now assist navigation, which calls for as high a degree of skill as navigation upon the sea.

In order to give big steamers an opportunity to load as deeply as possible, commissions of American and Canadian engineers keep constant watch over the water levels in each of the lakes. This is necessary because the channel at Niagara and the Drainage Canal at Chicago draw off enormous quantities of water, and if the level of the lakes should be lowered by even a foot below the standard depth, the heavily-laden cargo steamers could not negotiate critical points in various channels with safety.

Several important naval engagements were fought on the Great Lakes during the war of 1812 between Britain and the U.S.A. Then in

GREAT LAKES

1817, the Great Lakes were neutralized by agreement, and for more than a hundred years no naval force has been maintained on them, and the forts which had been erected to protect strategic points have been left to fall into picturesque ruins

Grebe. The young grebe is born afloat, for when he has pecked his way out of the egg, he finds himself on a sort of raft-nest floating on the water. For a few minutes he looks over the edge of the raft, observers tell us, and then—splash! Over he goes, swimming off with all the skill of an old hand. The grebe parents have a most interesting way of taking the little ones riding on their backs, nestling just under the wing-coverts, with only their heads exposed. At the slightest



GREAT CRESTED GREBE

A Brook

You'll be very lucky indeed if you see a sight such as this in real life, for though the great crested grebe is now found in many parts of Britain, it is very hard to get close when the bird is on its nest. What is more, the nest itself is often floating in the muddy water of the reed-bed.

sound, up go the parents' feathers, completely hiding the chicks, and sometimes, if alarmed, the old birds will dive, keeping the little brood in place under the wings.

Grebes' legs are placed so far back that when they walk they carry their bodies upright, like penguins waddling awkwardly along. On the wing, too, they are not very expert, and the water is indeed their native element. Their smooth, hair-like plumage is waterproof.

The two grebes seen in Britain are the dabchick or little grebe (*Podiceps ruficollis*), a brownish purple little bird, and the great crested grebe (*P. cristatus*), which is a large bird, with a rosette-like crest on its crown, and a ring of long feathers round its neck (see illustration above).

GREECE and Its PLACE in HISTORY

The past of Greece is of infinitely greater importance to the world than its present, yet by studying its geography at the present day the reasons for its glorious history are made apparent.

Greece. It is often a matter of wonder to the traveller in Greece how so small a country could fill so large a place in history. From Mount Olympus, which marked the northern limit of ancient Greece, you can see over nearly all northern and central Greece, and if you take your stand on Mount Parnassus (modern Laakoura), which is near the centre of Greece, you can see nearly all the mainland of this wonderful country spread out below you like a map. Travel less than a hundred miles south, and from the mountains of Sparta you can see Crete, the southernmost of the 500 islands which make up so important a part of Greece.

But though this little country is only a small patch on the map of the world, it was the cradle

Extent—Estimated at about 50,271 square miles, of which the mainland of Greece (roughly corresponding to the ancient Hellas) occupies about 40,000 square miles. Population, about 6,200,000.

Physical Features—Deeply indented mainland coast, with many small islands, especially Cyclades and Sporades groups in Aegean Sea. Corinth and Saronic gulfs nearly separate northern and central Greece from southern Greece (Peloponnesus, or Morea). Four-fifths of the surface covered by complicated mountain ranges, enclosing many small valleys, chief ranges, Cambunian and Pindus, highest point (in Thessaly), Mount Olympus (9,754 feet). No navigable rivers.

Products—Wheat, barley, rye, and other cereals, currants, grapes, and wine, olives and olive oil, figs, oranges, lemons, etc., tobacco, silk, sheep and goats, iron ores, lead, zinc, lignite, textile and leather manufactures.

Chief Cities—Athens (capital) and its port Piræus (combined population, more than 700,000), Thessalonika (Salonica) (236,000), Patras (61,000).

of European civilization, and has wielded a greater influence on the course of history than any other single nation. Why? The answer is largely a matter of geography. It was their land and sea, their mountains, bays, and islands, that helped to make the ancient Greeks what they were and determined the course of their history.

First you must notice that Greece is

the easternmost of the three peninsulas that Europe throws off into the Mediterranean towards Africa and Asia, where Man first emerged from barbarism to civilization. Between the mainland of Greece and the coast of Asia Minor the sea is strewn with several hundred islands—the tops of submerged mountains that once formed a continuous land-bridge. These islands are like

GREECE

a series of stepping stones, leading to the civilizations of Asia

Look more closely at the map, and you will observe that the sea fairly riddles the land, forming so many gulfs and capes that no part of Greece south of Thessaly is more than 50 miles from the coast. So many are the indentations that the coast-line of the Greek peninsula is longer than that of Spain and Portugal, although that peninsula is five times its size. The greatest of these inlets is the Gulf of Corinth, which all but cleaves Greece in two. The only connexion is the narrow Isthmus of Corinth (which is now cut by a canal), so that southern Greece, or Morea, was known to the ancient Greeks as Peloponnesus (Pelops Island).

Thus the sea everywhere opened its beckoning arms to the Greeks, and invited them to the adventurous and progressive life of the mariner and trader. Their natural keenness and alertness were increased by this constant intercourse with other peoples and lands, their imagination and thought were stirred, forming fruitful soil in which the seeds of Egyptian and Asiatic civilization might blossom.

This call of the sea was supported by the character of the Greek land itself. Four-fifths of its surface is wrinkled by a complex system of mountain ranges which chop the surface up into a number of tiny plains. Practically all the arable land is contained in these little isolated valley patches.

The remainder is divided between the forests from which the Greeks obtained the charcoal

that formed their only fuel, and the pasture land, most of it bristling with prickly asphodel and other dry scrub, too juiceless for the taste of any animals but sheep and goats. A few cows and pigs were raised, but sheep and goats supplied most of the meat. The "harvests of the sea"—chiefly tunny, sardines, and anchovies—largely took the place of meat in the Greek diet. On the scanty areas of tillable land were grown the "Mediterranean triad"—grain, the wine-grape, and the olive—which formed their staple foods. Moreover, these lands were far from being remarkable for fertility, and much hard labour was necessary to grow wheat and barley successfully. The few rivers are small and rapid.

The Greeks Arrive in Greece

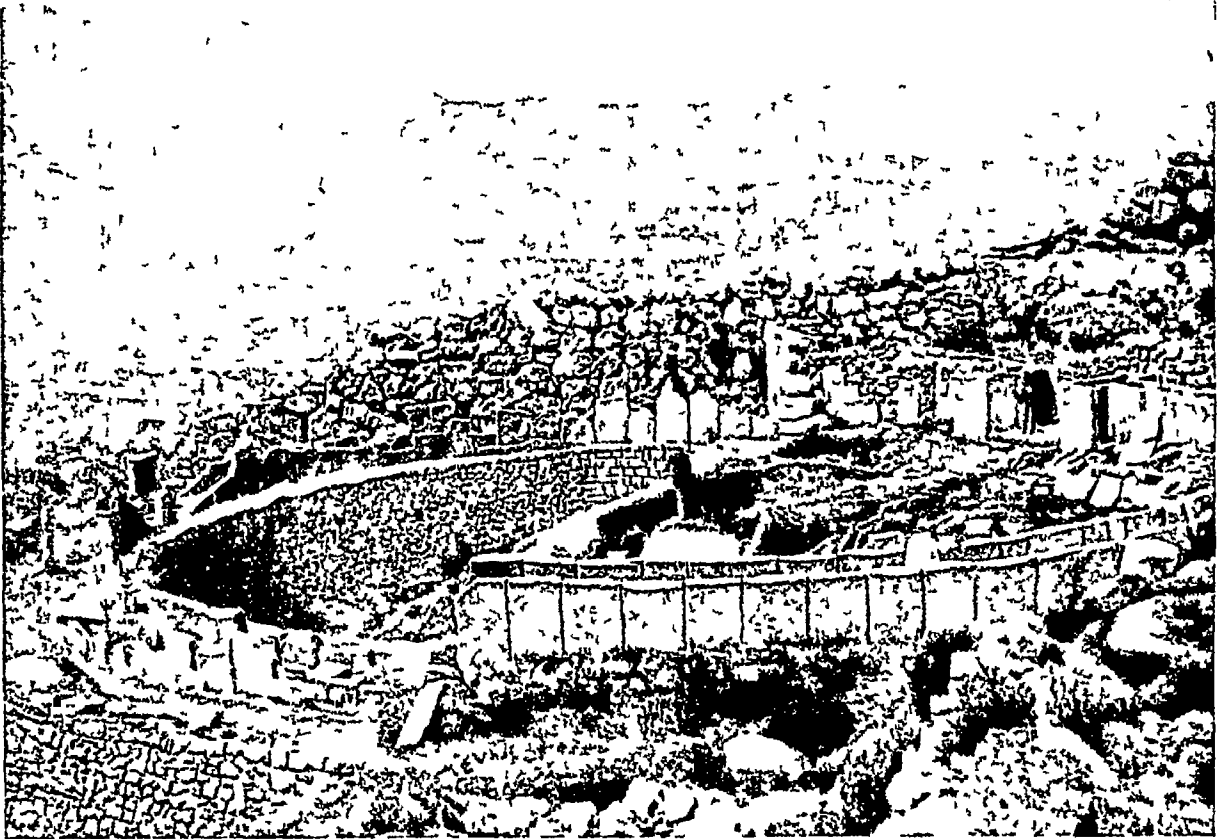
The story of the coming of the Greeks into this land takes us back to about 1500 B.C., when wave after wave of barbarian invaders swept over the towns and cities of a great civilization, destroying it and then gradually building up a new one upon its ruins. About the splendid and far-flung culture which the rude Greek tribesmen found on their coming into the Aegean basin—the Aegean civilization with its gold and bronze and pottery and paintings and its great palaces at Knossos in Crete and at Mycenae and Tiryns on the mainland—you may read elsewhere (see *Aegean Civilization*).

The Greeks who swept down from the north and overwhelmed these cities were simple nomadic herdsmen—a branch of the Indo-European race that had for centuries been drifting to the east and west from their home in the



THE LANDS WHERE THE ANCIENT GREEKS HELD SWAY

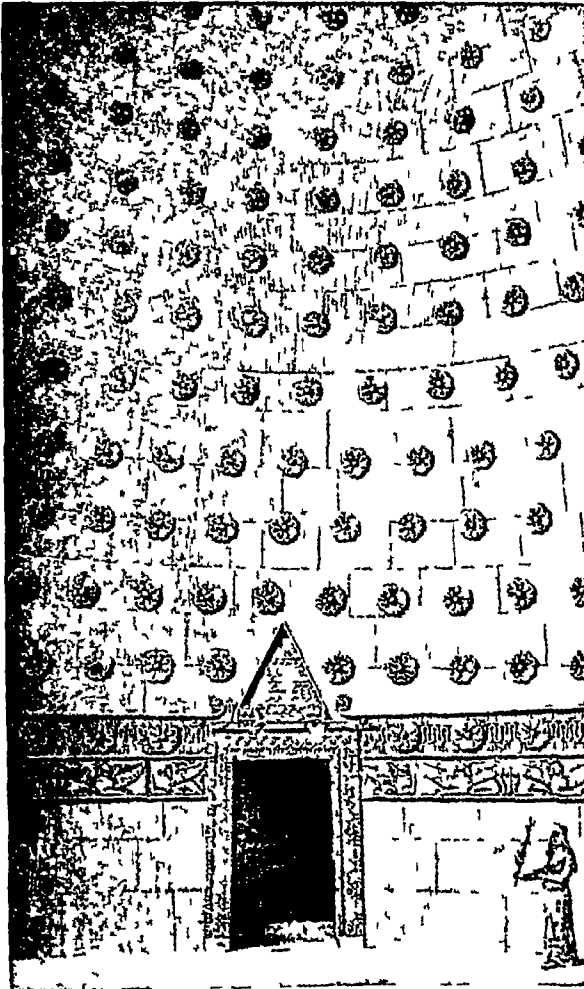
We must remember that in olden days the name "Greece" did not mean the Greek peninsula alone. It included also the "sprinkled isles" of the Aegean Sea, the western slopes of Asia Minor, Crete, Sicily, and Southern Italy. Indeed, the last two were known as "Magna Graecia" (Great Greece). In all these outlying lands were Greek colonies—mostly of the City-State type, patterned after Athens, Sparta, Thebes and the other cities of the homeland. Although they were for the most part independent communities, often at war with one another, they were spiritually united by the great bond of Greek civilization and culture. Today Magna Graecia forms part of Italy, and the former Asia Minor possessions belong to Turkey.



REMAINS OF 'GOLDEN MYCENAE'

Some of the most remarkable archaeological discoveries have been made at Mycenae, the "golden city" of Homer's song. Above is the grave circle of the Mycenaean kings, with the gravestones arranged around the sacred place. Close by stood the "Treasury of Atreus," a great beehive tomb, of which a reconstruction of the interior is shown on the left.

Upper photo W. E. Taylor



grasslands east and north east of the Caspian Sea. The first wave of invaders were the fair-haired Achaeans of whom we read in Homer. The Dorians, who composed the second wave, came, perhaps, three or four centuries later. Other tribes, the Aeolians and the Ionians, found homes chiefly on the islands and coasts of Asia Minor.

These Greek invaders must have absorbed something of the culture of the Aegean civilization when they settled down with the people they conquered. But, being still in the nomadic stage, they were not fitted for the whole heritage of urban civilization. So of the earliest stages of the Greek settlement we know little, for these invaders were neither builders nor writers. But we may imagine them moving southward from their pasture lands along the Danube, driving their herds before them, and only stopping in one place just long enough to plant and harvest one crop. These families settled down in the pasture lands of the peninsula, gradually took up farming, and little by little formed communities ruled by kings and elders.

At this point we can begin to picture them, for the background of the *Iliad* and the *Odyssey* is the background of the Age of the Kings.

A GOLDEN DAY IN GOLDEN GREECE OF LONG AGO



This Greek mother and her children are walking in the streets of ancient Athens. In the background are the famous buildings of the Acropolis bathed in sunshine. The distinguished French artist André Castaigne has here successfully caught the spirit of those glorious days of old, when life was more serene and leisurely than it is in these busy modern times. Beauty to the Greeks of old was one of the most important things in life, and no other people has ever realized the ideal of beauty so completely in their everyday surroundings.



DIVING FOR PEARLS IN ANCIENT GREECE

This portion of a Greek vase shows an early diver about to plunge into the sea, diving for oysters having been practised in Homer's time. The fishermen's boat has an eye painted on the bow, probably due to the fact that it was shaped like a fish's head. This curious form of decoration is still seen on some fishing boats in the Mediterranean.

British Museum

In Homer we see the Achaeans living very simply, a race devoted to warfare. Their weapons and their songs are the only splendid things they have, except for the gorgeous robes and the beautiful jewelry and metal work they bought from Phoenician traders. The palace of Odysseus is built of wood, a hall about a court. In this hall they cook and eat. Sometimes it gets very smoky, for there are no chimneys. And the bed of Odysseus is no work of the cabinet-maker's art, but a very crude affair wrought by Odysseus himself out of a tree.

In the *Iliad* we see Greeks from many cities—Sparta, Athens, Thebes, Argos, and the rest—all more or less united to fight their common foe, Troy in Asia Minor (*See Trojan War*). In historical times the Greeks were again able to work more or less together when the power of Persia threatened them all. But Greece never became a nation. The only patriotism the Greek ever knew was loyalty to his city. This seems strange to us nowadays, because their cities were so small. The people of all of them could be put into London without being unduly noticeable. Except Athens, probably no Greek city-state boasted more than 20,000 citizens, and most of them were less than half that size.

The reason for this disunity we have already touched upon. Just as Europe today is chopped up into nations, so on a smaller scale ancient Greece was divided by its mountain ranges.

And even the plains thus enclosed were in many cases subdivided, containing several city-states each surrounding its acropolis, or citadel.

Only in a few cases did the city-state push its holdings beyond very narrow limits. Athens held the whole plain of Attica, and most of the Attic villagers were Athenian citizens. Argos conquered the plain of Argolis. Sparta made a conquest of Laconia and part of the fertile plain of Messenia, the conquered people remaining subjects and not citizens. Thebes attempted to be the ruling city of Boeotia, but never quite succeeded. Similar city-states were found

throughout the Greek world, which had early flung its outposts over the Aegean basin and beyond.

The western shores of Asia Minor were fringed with Greek colonies. In Africa there were, among others, the colony of Cyrene, and the trading post of Nauoratis in Egypt. Sicily, too, was colonized by the Greeks, and there and in southern Italy so many colonies were planted that this region came to be known as Magna Graecia, or "Great Greece." Pressing farther still, the Greeks founded the city of Massilia, now Marseilles, in Gaul.

From Monarchy to Democracy

The government of many of the city-states—notably Athens—passes through four stages as we watch it from Homer to historical times. During the 8th and 7th centuries B.C. the kings disappear, and monarchy gives way to oligarchy, that is, the rule of the few. The power goes over to the wealthy land-owning nobles—the "Eupatrids," or well-born. But the rivalry among the nobles and the discontent of the oppressed masses are too great, and soon a third stage appears.

This third type of government is known as tyranny. Some Eupatrid suddenly seizes absolute power—usually by obtaining the favour of the people and promising to right the wrongs inflicted upon them by the other land-holding Eupatrids. He is known as a "tyrant," a word which among the Greeks was not a term of

ACROSS THE CENTURIES IN GREECE



One of the Seven Wonders of the World was the statue of the Greek god Zeus which adorned the temple of Olympia in Elis. It was the work of Pheidias the Athenian sculptor and like all Greek statues and buildings it was brightly coloured. This reconstruction shows how the huge figure of Olympian Zeus which excited such admiration among the ancients, probably looked

From the painting by Charles M. Sheldon based on Pausanias



A GREEK TEMPLE GLORIOUS IN DECAY

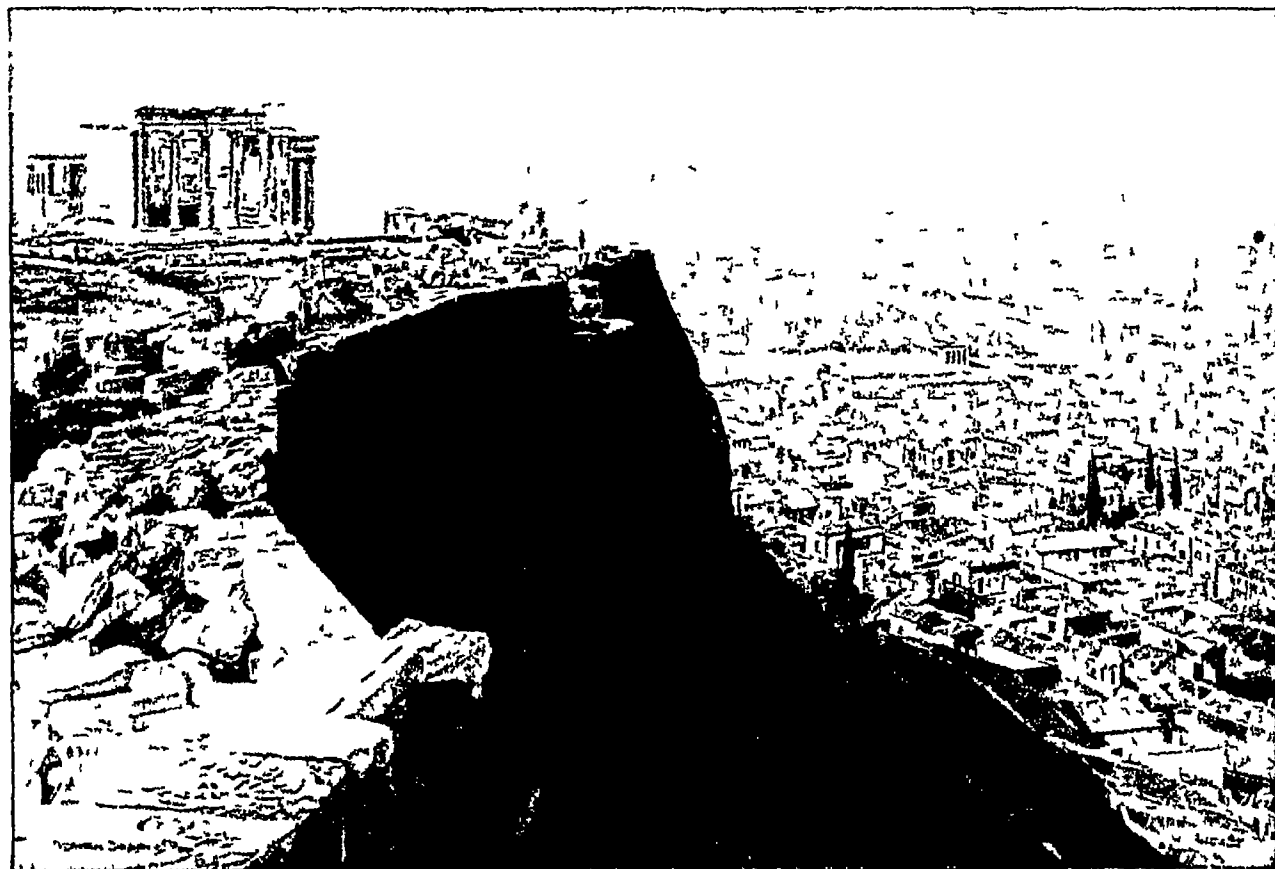
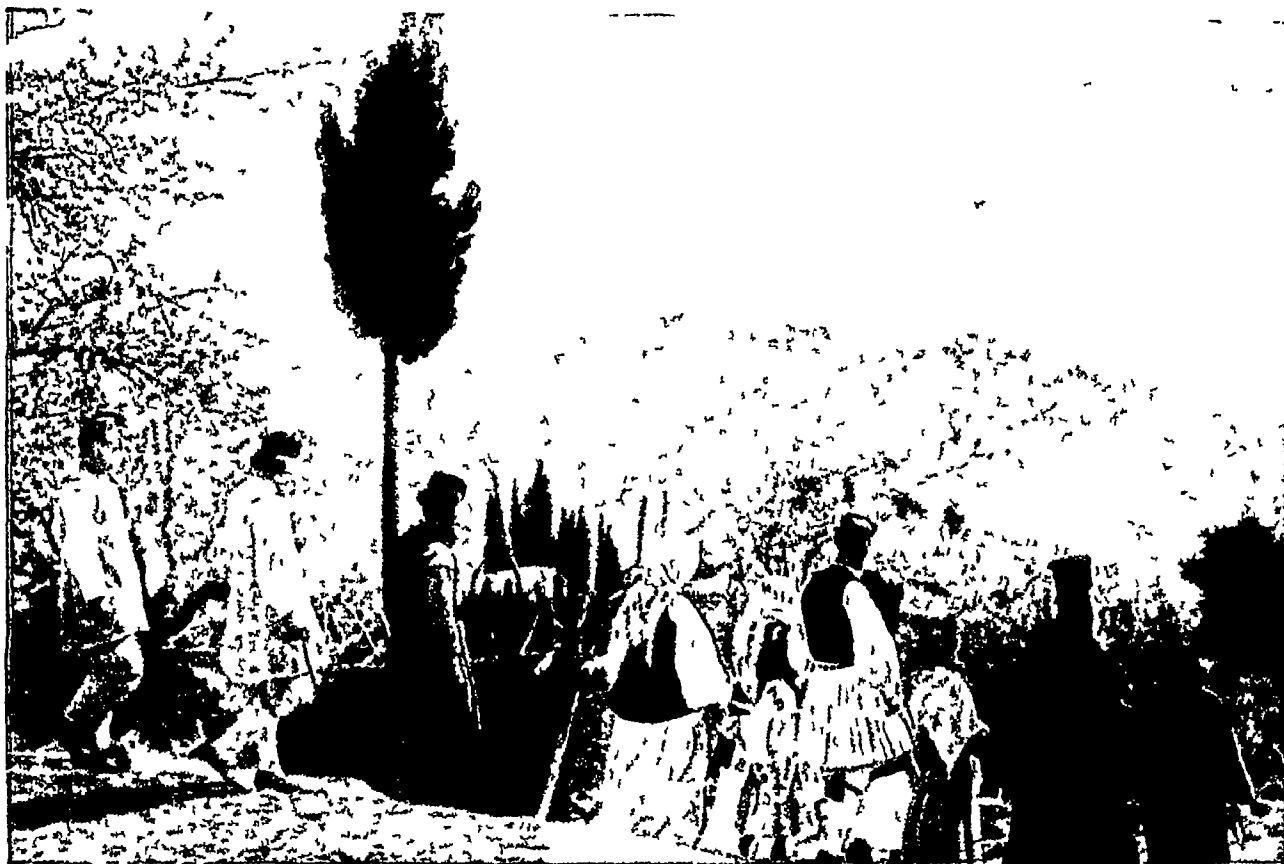
The Erechtheum, which stands on the Acropolis at Athens, was built in honour of the Greek hero Erechtheus and contained an image of Pallas Athene, guardian of the city. It is a building of great beauty, and much of it is still standing, though it was built well over 2,000 years ago. Here we see its remarkable porch, supported by six female figures, or caryatids as they are called, instead of ordinary pillars.



GRECIAN BELLES IN FESTIVE GARB

The two girls from northern Greece are wearing their native costumes in which bold colour are blended with artist's skill. Heavy gold embroidery and delicate needlework enhance the splendour of their dress and the girl on the left completes her costume with a massive belt of embroidered silver.

GLIMPSES OF GREECE: ANCIENT AND MODERN



The top photograph shows a characteristic scene in a Greek village. The villagers are walking homeward in the evening, dressed in their holiday clothes—one of the men wears the fustanella, or white kilt of the Greeks. The lower picture shows the Erechtheum (seen also in the opposite page), on the northern ramparts of the Acropolis, while below are the red roofs of the modern city of Athens.

Photos Fred Bolssonas E \ 1

GREECE

reproach, but merely implied one who had seized kingly power without the qualification of royal descent. The tyrants of the 7th century B C were a stepping-stone to democracy, or the rule of the people, which was nearly everywhere established in the 6th and 5th centuries B C, for the tyrant taught the people their rights.

By the beginning of the 5th century B C Athens had gone through these stages and emerged as a democracy—the first democracy in the history of the world. Between two and three centuries before this the kings had been displaced by officials called “archons,” elected by the nobles, and the aristocratic form of government was established.

Reforming the Laws

About 621 B C an important step in the direction of democracy was taken, when the first written laws in Greece were compiled from the existing traditional laws. But this code, which was so severe that the adjective “draconic,” from the name of its compiler Draco, is still used for “harsh,” did not give the oppressed classes sufficient relief. A revolution was averted by the reforms of Solon, a generation later.

But Solon's reforms only put off the fatal day, and about 560 B C Peisistratus, aided by the discontented, made himself tyrant. With two interruptions, Peisistratus ruled for more than 30 years, fostering commerce, agriculture and the arts, and laying the foundation for much of Athens' future great-

ness. His sons Hippias and Hipparchus attempted to continue their father's power, but Hipparchus was slain in a private quarrel by two youths, Harmodius and Aristogiton, and Hippias was expelled four years later, the murderers of Hipparchus henceforth being regarded in Greek tradition as patriots and martyrs and as themes for sculptors and poets. By the reforms of Cleisthenes, about 509 B C, the nobles were shorn of much of their power, and the rule of the people was firmly established.

Very different was the course of events in Sparta (q v), which had now established itself as the most

powerful military state in Greece. Under the strict laws of Lycurgus, Sparta had maintained its primitive monarchical form of government with little change. Nearly the whole of the Peloponnesus had been brought under its iron heel, and it was now jealously watching the rising power of its democratic rival, Athens.

Suddenly there loomed in the east a thunder-cloud which threatened to sweep away the whole promising structure of the new European civilization. Persia, the great Asiatic world-empire of the day, had suddenly been awakened to the existence of the free peoples of Greece by the aid which the Athenians had sent to their oppressed kinsmen in Asia Minor. The dramatic story of how the scanty forces of the Greeks drove back the enormous heavily armed Persian hordes is told in the article on the Persian Wars.

From this momentous conflict Athens emerged a blackened ruin, but yet the richest and most powerful state in Greece. She owed this position chiefly to the shrewdness of her statesman Themistocles, who had seen that naval strength, not land strength, was henceforth to be the key to power. “Whoso can hold the sea has command of the situation,” he said. He persuaded his fellow Athenians to build a strong fleet and to fortify the harbour at Piræus.

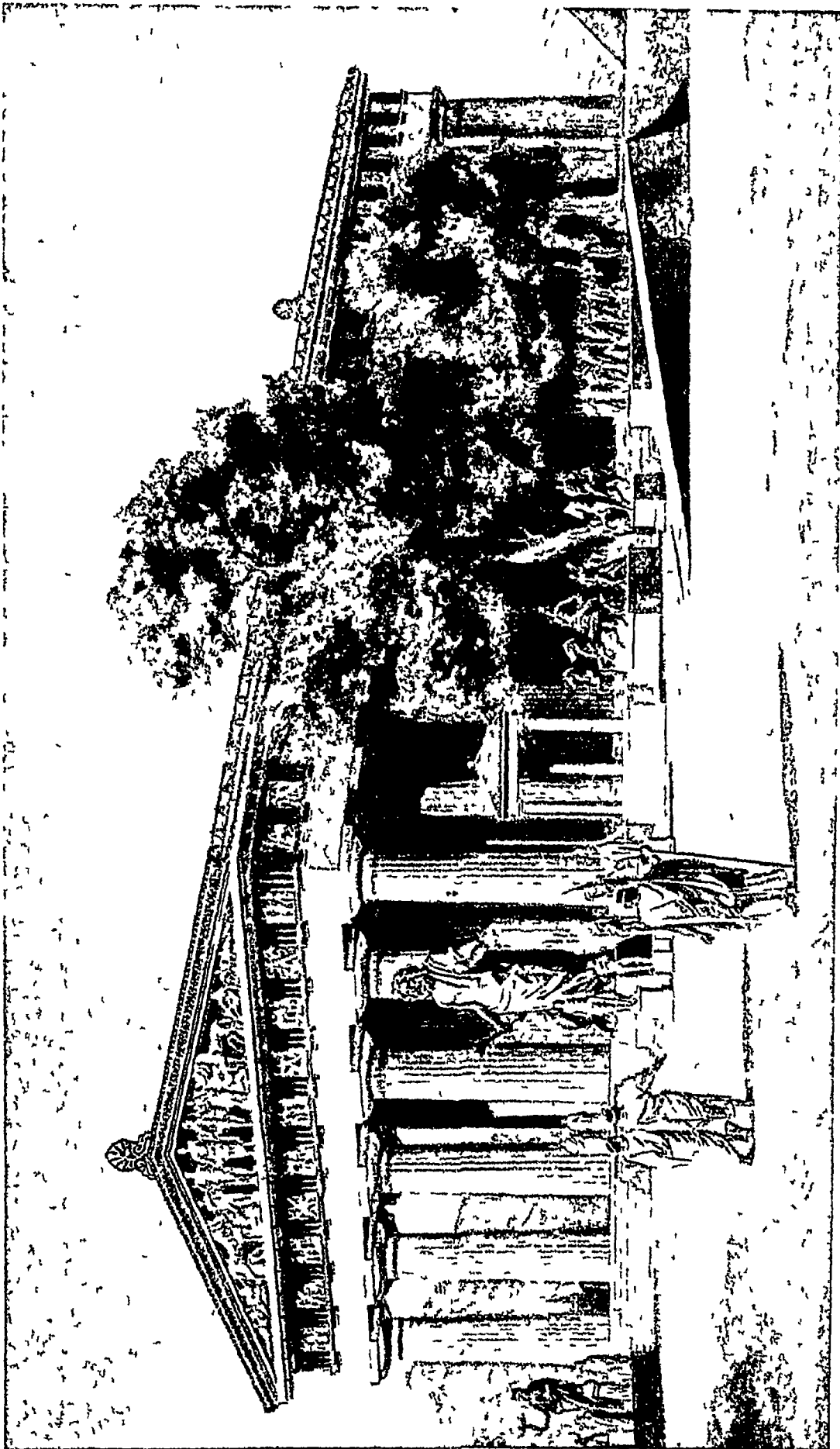
This fleet became the instrument by which the Persians were finally defeated at the battle of Salamis, and also by which Athens made



COMMEMORATING A VICTORY IN THE GAMES

Greek art was greatly affected by the Greeks' love of athletics. Such a painted vase as this, though not perhaps of the highest artistic merit, would have great value to its possessor since it was awarded as a prize in the Panathenaic Games. This vase was given to the winner of a chariot race, and other vases were ornamented with paintings of boxing and horse racing.

From "Journal of Hellenic Studies"



COLOURFUL GLORY OF A TEMPLE WHICH ENSHRINED THE WORSHIP OF THE ANCIENT GREEKS

Most of the ancient runs of Greece are but fragments of once splendid buildings, and it is sometimes difficult to imagine how they looked when they were intact. In this illustration the artist has reconstructed a great Greek temple—the general idea is that of the Temple of Zeus at Olympia—and has shown it as it appeared soon after its completion. It must be remembered that, though we are apt to think of the Greek buildings as being white, in reality the friezes and pediments were picked out in brilliant colours. The statues that ornamented the temples were likewise brightly coloured. This is not surprising considering that Greek Art was derived from Egypt, where colour was lavishly employed.

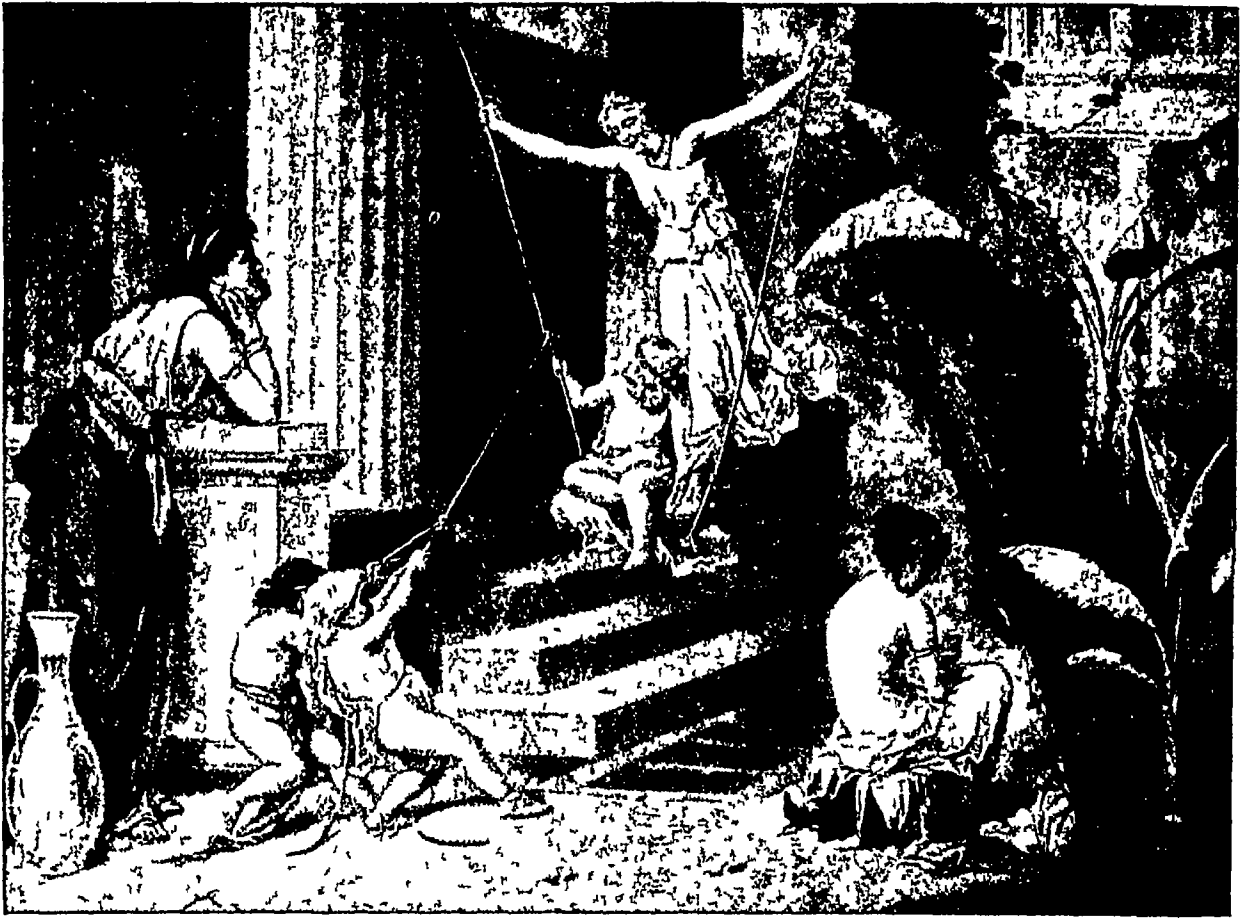
After the reconstruction by Curtius and Adler

This illustration shows a reconstruction of Athens in its palmiest days. Propylae and the roof of the Parthenon can be seen. To the left of the Agora is the Stoa, or portico, of Attalos with the Stoa Poikile continuing the line. At the back is the Senate House, and the Tholos, where certain high officials dined at the public expense. In front are the shrine and statue of Eirene and Pluto, with the Bema or Rostrum, from which speeches were made, in the centre of the steps.

ATHENS AT THE HEIGHT OF HER SPLENDOR, MORE THAN 2,000 YEARS AGO

The foreground is the Agora, or market place, dominated by the Acropolis on which the statue of Athena stood. To the left of the Agora is the Stoa, or portico, of Attalos with the Stoa Poikile continuing the line. At the back is the Senate House, and the Tholos, where certain high officials dined at the public expense. In front are the shrine and statue of Eirene and Pluto, with the Bema or Rostrum, from which speeches were made, in the centre of the steps.

After the restoration by Bohnemann



GREEK CHILDREN IN THEIR PLAYGROUND

The houses of the Greeks were usually built round a court, which was the garden of the family and the playground of the children. Not only did the youngsters find swinging as delightful an amusement as do the children of today, but their games and toys were very much like our own. Here we see an idealized picture of a Greek home, one such as belonged perhaps to some rich Athenian. The costume of the woman at the left indicates that she is the children's nurse.

herself mistress of the Aegean. For, within three years after Salamis (480 B.C.), Athens had united the Greek cities of the Asiatic coast and of the Aegean islands into a confederacy (called the Delian League, because the treasury was at first on the island of Delos) for defence against Persia, and in another generation this confederacy had become an Athenian empire.

Almost at a stride Athens was transformed from a provincial city to an imperial capital. Wealth beyond the dreams of any other Greek state flowed into her coffers—tribute from subject and allied states, customs duties on the merchandise that poured through the Piræus, and revenues from the Attic silver mines. The population increased fourfold or more. Learning and the arts flourished as never before.

This period, which stands out as one of the most remarkable and brilliant in the world's history, reached its culmination in the age of Pericles, 460–430 B.C. (See Pericles). Under the stimulus of wealth, power, abundant leisure and free institutions, the citizen body of Athens attained a very high average of intelligence.

But we must remember that a very large part of the Athenian population were not citizens, for the Athenian state rested on a foundation

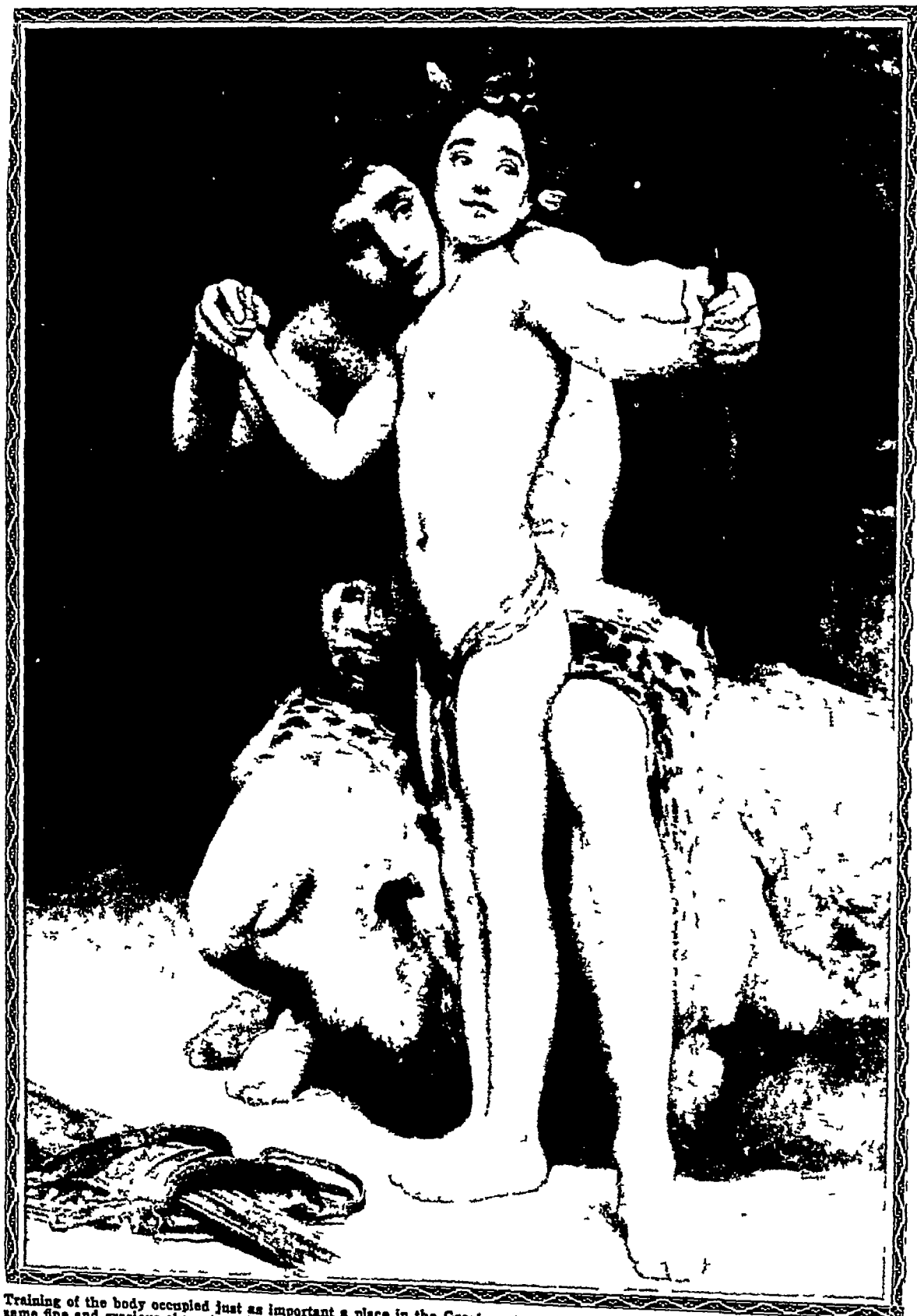
of slavery. Two-fifths (some authorities say four-fifths) of the population were slaves (often, if not usually, themselves of Greek blood) whose labour produced a large part of the wealth that gave the citizen the time and money to pursue art and learning and serve the state.

Boys Kidnapped into Slavery

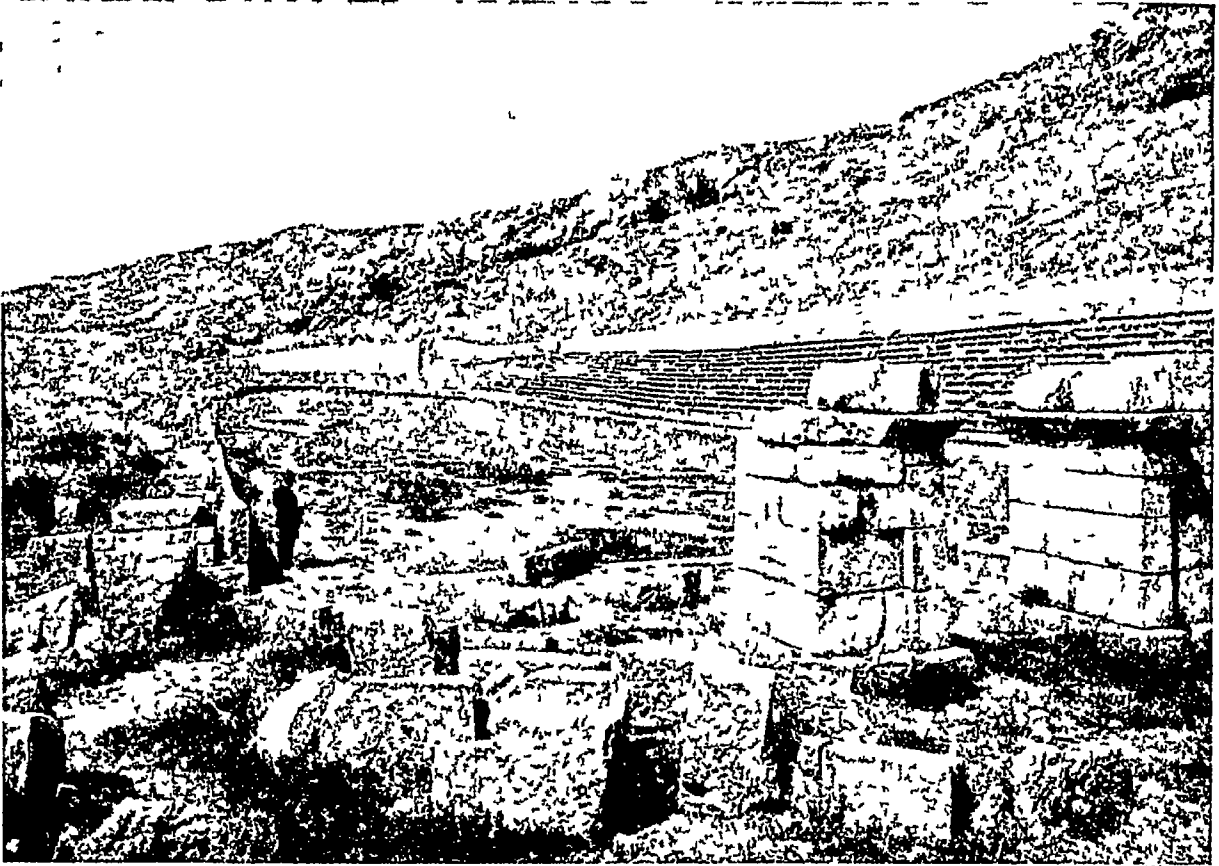
Slavery in Greece was a peculiar institution. When a city was conquered its inhabitants were often sold as slaves. Kidnapping boys and men in "barbarian," that is, non-Greek lands, and even in other Greek states, was another steady source of supply. If a slave was well educated or could be trained to a craft, he was easily disposed of. And a slave always had a chance of obtaining his freedom, for quite frequently his master would let him work for hire, and this gave him an opportunity to save money. After he had bought his freedom or been set free by a grateful master, he became a "metio"—resident alien. Many of the slaves who could not be trained, however, had a miserable lot. They were sent in gangs to the silver mines at Laurium, where they worked underground in bad conditions.

Though the citizens of Athens were thus set free from much of the drudgery of life, we must not imagine that they revelled in luxury, the

A YOUNG GREEK ATHLETE IN THE MAKING



Training of the body occupied just as important a place in the Greek system of education as the training of the mind, and that same fine and gracious character which marked other aspects of their life was also present in their athletic contests and games. This picture by Lord Leighton, former president of the English Royal Academy, shows a young man instructing a boy in the art of shooting with the bow.



Alinari

WHERE GREEK ATHLETES ONCE RAN THE RACE

Physical exercise played as great a part as scholastic work in the Greek conception of education, their aim was to produce the perfect man in body and mind alike. This is the cause of the importance in Greek life of the Games, the gymnasium and the stadium. Above is what remains of the public stadium at Delphi, where were held the Pythian Games, second in importance only to the Olympic Games, here there were held contests not only at the great festivals, but also all the year round.

standard of comfort was very low, in comparison with our own. The houses were of sun-dried brick, built two storeys high along narrow, winding streets, into which all refuse was thrown. The people had two meals a day, each consisting of bread, perhaps a broth of beans and pulse, with wine and sometimes fruit. Fish with the bread was considered a remarkably fine meal. Olives and olive oil were largely used, honey took the place of sugar, cheese was often eaten in place of meat, but butter was practically unknown. The only heat in the house was from a brazier or dish of burning charcoal. There was no plumbing, nor were there any chimneys, the smoke from the stove in the tiny kitchen finding its way out through a hole in the roof. There were no windows on the ground floor, but in the centre of the house was a broad open court, with the men's apartment, the women's apartment, and the small cupboard-like bedrooms clustered about it. The upper storey sometimes had a window or two looking on the street.

The real life of the city was out of doors. The men spent much of their time talking politics, and philosophy in the agora, or market-place, exercising or lounging in the athletic fields, performing military duty, sitting in the Assem-

bly or the Council of 500, taking part in the numerous state festivals, or doing jury duty—there were 6,000 jurors on duty all the time in Athens, for all the allied cities were forced to bring their cases to Athens for trial. A daily salary was paid for jury service and service on the Council, and this made up a considerable part of the income of the poorer citizens.

The women stayed at home, attending to the affairs of the house, and spinning and weaving the wool for clothing. They never acted as hostesses when their husbands had parties, and were only seen in public at the theatre—where they might attend tragedy but not comedy—and at certain religious festivals.

Such was life in Athens in the heyday of her glory, before the jealousy of Sparta and other independent Greek states, and the discontent of the subject states of the Athenian Empire, flamed up into a war that for ever broke the power of the great city. Already the first of the inevitable clashes between imperial Athens and her rivals, chief of whom was Sparta, had wasted the strength of most of Greece by many years of indecisive struggle. This was the first of the Peloponnesian Wars (460-454 B.C.). In 431 B.C., in spite of the exhaustion of both sides, war again broke out.

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The plan of Pericles in the Second Peloponnesian War was not to fight at all, but to let Corinth and Sparta spend their money and energies while Athens conserved both. Therefore, he got all the inhabitants of Attica to come inside the walls of Athens, and let the Peloponnesians enter the plain of Attica year after year and ravage as they would, while Athens, again without losses, harried their lands by sea. But Pericles reckoned without the dangers of overcrowding. The plague broke out in Athens and killed one-fourth of the population, including Pericles himself, and left the other three fourths without spirit and without a leader. After dragging along for ten years, this war ended still undecided.

Disaster in Sicily

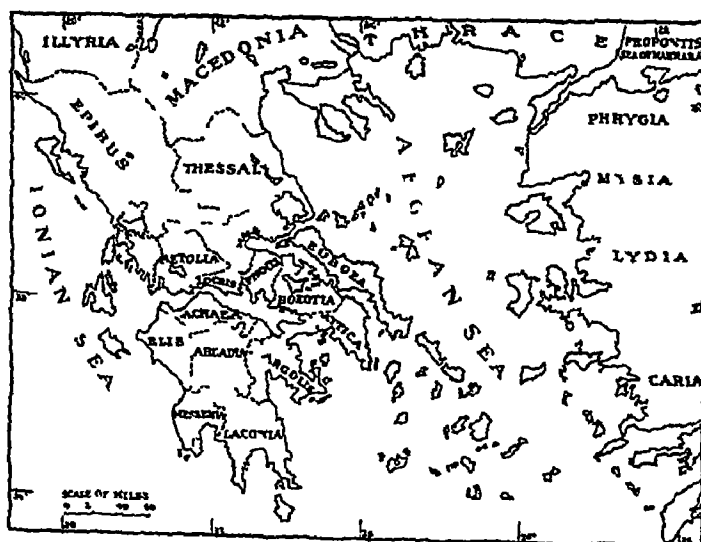
Almost before they knew it, however, the Athenians were whirled by the unscrupulous demagogue Alcibiades, nephew of Pericles, into the Third Peloponnesian War. Wishing for a brilliant military career, Alcibiades persuaded Athens into a great expedition against Syracuse. But this suffered an overwhelming disaster in 413 B.C., being completely destroyed, while the Athenian captives were sold into slavery.

This disaster sealed the fate of Athens. Those of the subject or allied cities about the Aegean that had remained faithful now deserted to Sparta, and the Spartans laid Athens under siege. Then in 405 B.C. the whole remaining Athenian fleet of 180 triremes was captured in the Hellespont at the battle of Aegospotami. Besieged by land and powerless by sea, Athens could neither raise grain nor import it, and in 404 B.C. the Athenian Empire came to an end. The fortifications and long walls connecting Athens with Piræus were destroyed, and Athens became a vassal ally of triumphant Sparta.

Sparta maintained its supremacy by keeping Spartan garrisons in many Greek cities, and this custom, together with Sparta's hatred of democracy, made its rule unpopular. After various unsuccessful attempts Thebes at length succeeded in shaking off Sparta's heavy hand. At the battle of Leuctra in 371 B.C. the Thebans, under their gifted commander Epaminondas, brought Spartan power to an end. The era of Theban leadership was, however, short-lived, for the Theban power was the one man power of Epaminondas, and when he was killed at the battle of Mantinea in 362 B.C. Thebes really suffered defeat in spite of its victory. The age of the powerful city-states was at an end, and a prostrated and powerless Greece invited a conqueror.

Such a conqueror was found in the young and strong country of Macedonia, lying just to the north of classical Greece. Its king, Philip, who came into power in 359 B.C., had spent three years in Thebes as a hostage, and, seeing the weakness of the disunited cities, made up his mind to possess the Greek world. Demosthenes saw the danger that threatened, and by a series of fiery speeches against Philip sought to unite the Greeks as they had once been united against Persia. But Philip was too strong for them, and at the battle of Chaeronea (338) established his leadership. Before he could carry his conquests to Asia Minor, however, he was killed and his power fell to his son Alexander, then not quite 20 years old. How Alexander built an empire that embraced almost the entire known world is told in the separate article on Alexander the Great.

Alexander made the whole face of the world Greek as he organized his conquests. What he did is a heritage for us to this day, for by imposing the West upon the East he prevented



THE DIVIDED STATES OF GREECE

One of the reasons for the downfall of ancient Greece before the Roman legions was the lack of political unity between the many small states into which the peninsula was divided. These divisions, shown in this map, were caused by the many inlets from the sea and mountain ranges, which separated the country into isolated valleys and plains.

the East from imposing itself upon the West. Greek culture means freedom of spirit, and, as the Romans put it, a healthy mind in a healthy body. The East was a great system of enslavement. Masses of humanity were driven to battle by the lash. They were forced to build palaces under the tropical sun and to make sculptures of prodigious size for the glory of one man, but they took no such joy in any of their work as did the Athenians.

The three centuries that follow the death of Alexander are known as the Hellenistic age for their products were no longer pure Greek,

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but Greek plus the characteristics of the conquered nations. It was a time of great wealth and splendour. Art, science and letters flourished and developed. The private citizen no longer lived crudely, but in a comely, comfortable house, and many cities adorned themselves with beautiful public buildings and sculptures.

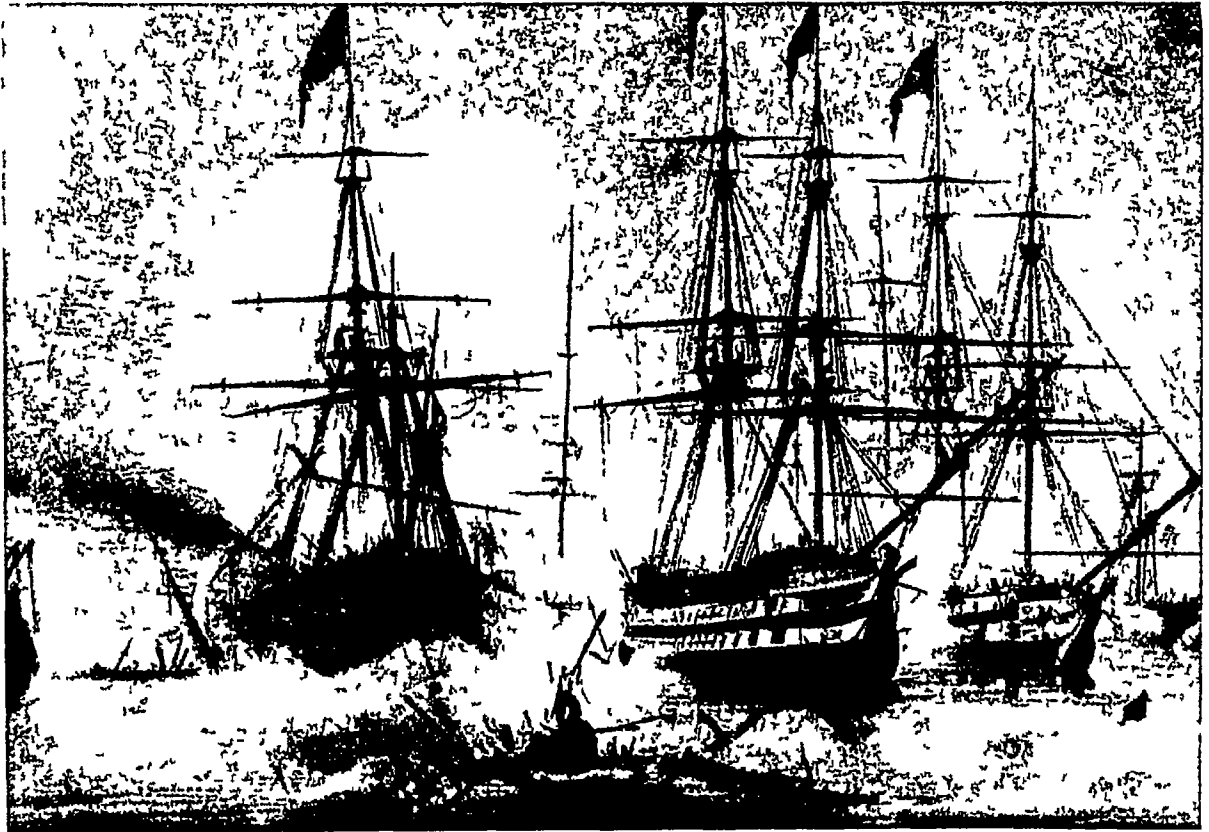
This age came to its end in another conquest—that by Rome. On the field of Cynoscephalae ("dogs' heads"), in Thessaly, the Romans defeated Macedonia in 197 B.C. and gave the Greek cities their freedom as allies. Even so the Greeks caused Rome a great deal of trouble, and were taught their lesson by the burning of Corinth in 146 B.C. and by their reduction to vassalage. Athens alone was revered and allowed to retain a certain amount of freedom, and to its schools resorted many Romans, Cicero among them. Though Rome conquered Greece on the field of battle, Greece continued to exercise power over Rome in art and letters.

For more than 2,000 years, from the time of Alexander the Great to the third decade of the 19th century, the Greeks passed from one master to another. The last of these conquerors was Turkey, which established its dominion during the 15th century. At the beginning of the 19th century the power of Turkey

was waning. Revolts by subject peoples and by the outlying parts of the empire itself were becoming more and more frequent. In 1821 the Greek nation as a whole rose in arms in the Greek War of Independence. Russia was interested because the Greek Catholic Church was also the State Church of Russia, and Russia had for years claimed the right to protect the Greek Christian subjects of the Turks.

Numerous volunteers from Europe joined the Greeks—Lord Byron among them—and fought the troops of the Sultan with varying success. Terrible massacres were committed on both sides. In 1827 the Turkish fleet was destroyed at the battle of Navarino by the combined British, French and Russian fleets, but there the joint action ceased. Next year Russia took matters into her own hands, marched an army into the Balkans, and took Adrianople. In the peace of Adrianople (1829) Turkey signed a peace whose outcome was the restoration of independence to the Greeks.

In 1832, after serious disorders and the murder of its provisional president, the three protecting powers raised to the throne of Greece Prince Otto, son of Louis I of Bavaria. Otto, however, ruled after the German manner, with German advisers, and the Greeks in 1862 revolted and

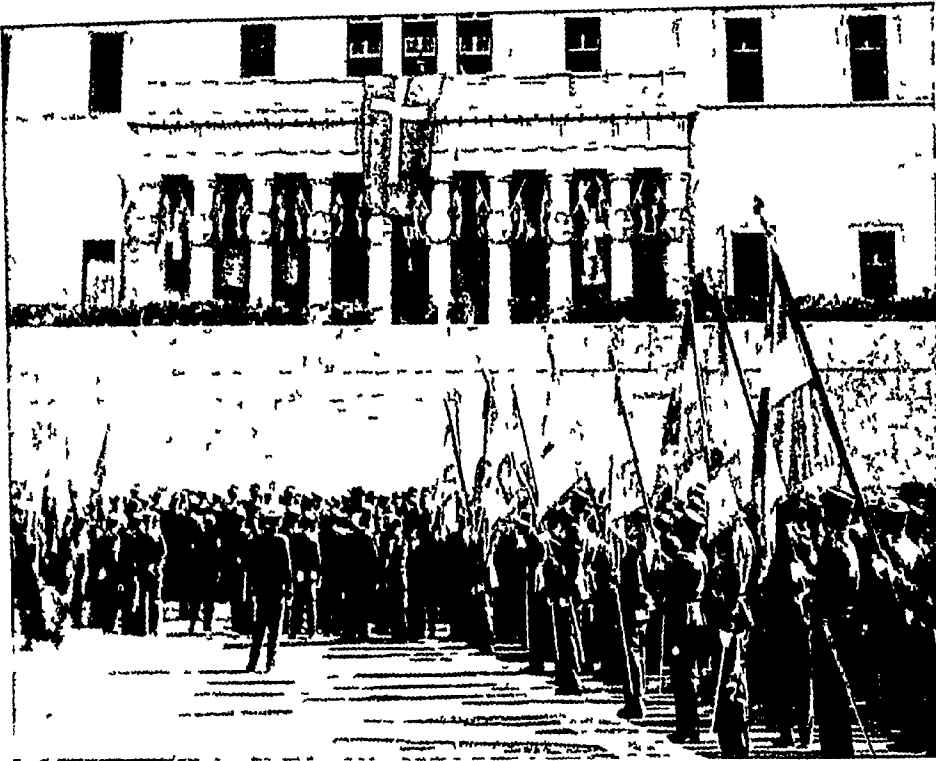


DESTRUCTION OF THE TURKISH FLEET AT NAVARINO

The battle of Navarino was fought on October 20, 1827. It was the decisive action in the Greek war of liberation. On the morning after the battle the British admiral, Sir Edward Codrington, wrote "Out of a fleet of 81 men-of-war only one frigate and 15 smaller vessels are in a state to put to sea again." The illustration shows H.M.S. Asia, Codrington's flagship, in the centre. On the right of the picture is the Egyptian admiral's flagship, and on the left the Turkish admiral's

Macpherson Collection

GREECE



GEORGE II ACCLAIMED KING FOR THE SECOND TIME

The political history of Greece during this century has been a chequered one. King George I was assassinated in 1913; his successor, King Constantine, was exiled by the Allies during the World War in 1917 and the son who took his place died after a reign of three years. Constantine then returned to the throne but was forced to abdicate in 1922. He was succeeded by his eldest son, George II, who left the country when a republic was established in 1923. In 1935 a plebiscite gave a vast majority for the restoration of the monarchy, and George II returned to Greece as King of the Hellenes on November 25, 1935.

This photograph shows the King appearing to his people on the balcony of the Royal Palace after his return to Athens.

deposed him. In the following year Prince George of Denmark became king and reigned until his assassination in 1913. In 1864 Great Britain ceded to Greece the Ionian Islands, which had been under British protection since 1815. Thessaly, on the north, was secured between 1881 and 1897. The island of Crete was not allowed by the Powers to be a part of Greece until 1913. It was not until 1916 that the 56 mile link was completed that now connects the Greek railways with those of the rest of Europe.

In the Balkan War of 1912-13, the allied Balkan states thoroughly defeated Turkey, and Greece gained a broad strip of territory on the north, amounting to some 17,000 square miles and including a great part of ancient Macedonia (See Balkan Peninsula). This was the greatest expansion the kingdom had experienced since 1862. In the World War of 1914-18 Greece proclaimed her neutrality, but King Constantine, who was married to the sister of the Emperor William II of Germany, was accused by the Allies of secretly aiding the Central Powers.

The prime minister Venizelos, who had piloted his country through the Balkan Wars, revolted after he had twice been dismissed unconsti-

tutionally by the king, and in June, 1917, King Constantine was forced by the Allies to abdicate in favour of his second son, Alexander, and leave the country. In the peace settlement which followed the close of the War, Venizelos obtained exceedingly favourable terms for Greece, including the annexation of Thrace to the Black Sea (with Adrianople, now called Edirne), together with Smyrna (Izmir), and a large adjacent district in Asia Minor. But in December, 1920, following the death of Alexander from the bite of a pet monkey, Constantine was restored by an overwhelming vote.

The Greek government attempted to enforce their claims to the lands granted them in Asia Minor, but their armies were defeated by Turkish nationalists in 1921, and the whole position of Greece was shaken. In August, 1922, the Turks attacked the Greek army in Asia Minor, and early in September they occupied Smyrna after the Greek forces had been withdrawn. As a result of a revolutionary movement in Greece, Constantine again abdicated in favour of his son, who succeeded to the throne as George II.

The Greek constitution adopted on October 29, 1864, placed the legislative power in the hands of a single Assembly elected by manhood

GREECE

suffrage In 1911 this constitution was altered to provide for a second chamber Greece was proclaimed a republic in 1924 Business depression resulted in political upheavals and plots to restore the monarchy General Pangalos set up a dictatorship in 1925 The next year General Kondylis overthrew him, and other military dictatorships followed From 1928 to 1932 Venizelos was virtually dictator After further political upheavals, including an unsuccessful revolt against the royalists which was supported by Venizelos, the monarchy was restored in 1935, King George II returning to the throne

A Visit to Present-day Greece

And now let us visit the land whose fortunes we have been following through thirty centuries

An hour or so by train from Athens will take you to the mines at Laurium, from which came the silver to pay for Themistocles' "wooden wall"—the fleet which made Athens head of an empire A Greek and a French company are working these mines today, and a guide will take you through some of the 2,000 ancient galleries that lie side by side with the newer ones

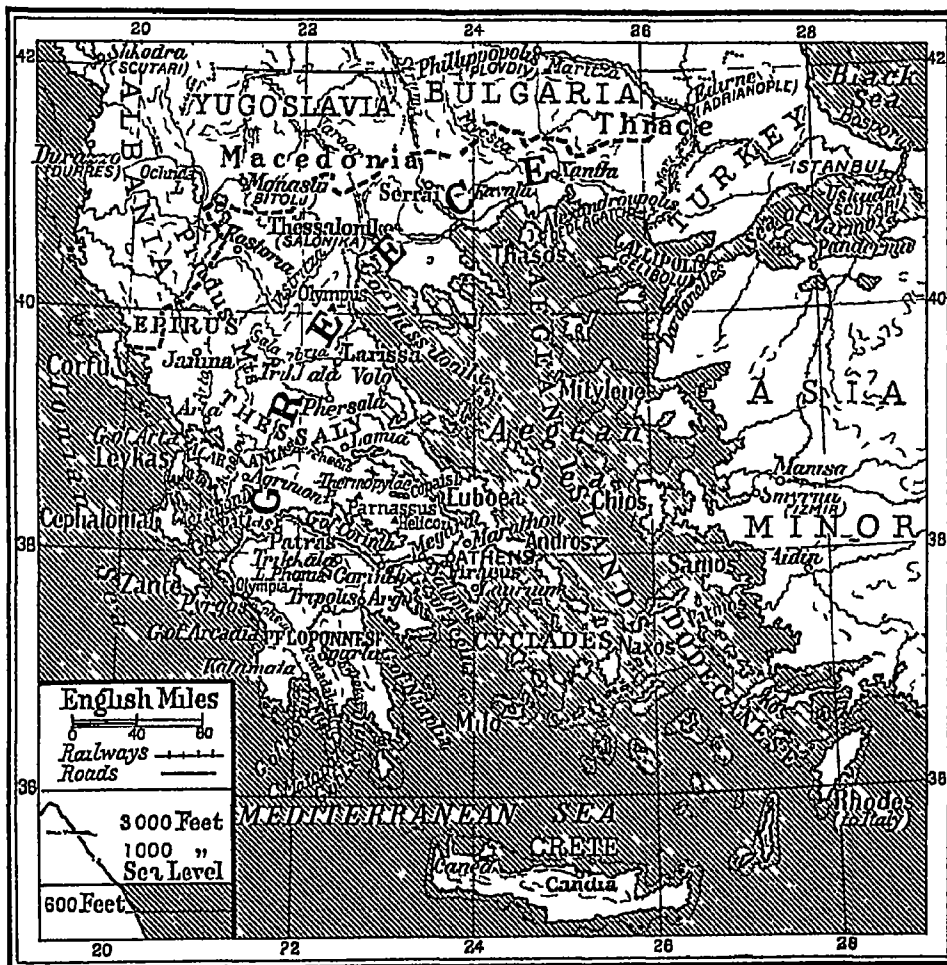
Of Thebes and Corinth, the ancient neighbours and rivals of Athens, and of Sparta, the more distant enemy city, the earthquakes and other accidents of 2,000 years have left little now standing But although the archaeologists have no hope of ever locating the famous seven gates of Thebes, the visitor readily appreciates the beautiful situation of what is now just a country town It is surrounded by mountains, with the famous Helicon and Parnassus on the west To the north-west lies Lake Copais, which formerly was a shallow and unhealthy sheet of water and marsh, but which has now been drained, redeeming 60,000 acres of fertile land

The most interesting excavations in Greece are in the Peloponnesus at Olympia, which may be reached by rail from Corinth As you journey along the Gulf of Corinth you will see luxuriant vineyards and dazzling white fields set apart for drying currants Tall dark cypresses and mountain torrents add to the beauty of the landscape The currant industry became so profitable in the late 1870's when phylloxera attacked the vines of France that Greek agriculturists

cut down their precious olive groves in order that they might plant more currants

Olympia, like Pompeii, is a buried city which modern enterprise has brought to light In the three centuries following the last celebration of the Olympic Games, in the 4th century A.D., the chief temples were overthrown by earthquakes, the treasures were covered by a landslide, and the whole site buried under two or three layers of sand by the two rivers at whose junction it lies In the museum there you will find the original Hermes of Praxiteles, one of the greatest pieces of ancient sculpture

Other important finds have been made at Delphi, once the site of the famous oracle



GREECE'S PENINSULA AND SCATTERED ISLES

The Kingdom of Greece today represents most of the ancient land of the same name, save that parts of Macedonia and Thrace have been lost Included within its borders are the Ionian Islands in the Adriatic, the Cyclades and several other groups in the Aegean, and the historic isle of Crete to the south The surface of the country is mountainous, and the coastline is rugged and deeply indented



SOME FOLK OF MODERN GREECE

Directly above you see a typical old Greek woman, spinning by hand as she stands outside her wayside home. On the right are two boys, all dressed up in their best national costume, while, below, some monks are seen in St. Stephen's monastery,

one of the Meteora group
Photos Dorcen Leigh Geo Long

You will enjoy a visit to this beautiful spot on the northern shore of the Corinthian Gulf, whose cold springs and cool air currents from the chasms of Mount Parnassus early excited the awe of the Greeks. The famous Castalian spring was filled up by an earthquake in 1894.

A visit to the little island of Aegina, about 15 miles south-west of Athens, will also be well worth while. This has a prosperous agricultural and fishing community, famous for its pottery, and for the sponge fishing carried on by divers. But it is most interesting for the remains of its splendid temple of Zeus.

Some day when the Aegean Sea is calm you will sail from the Piraeus to visit the Cyclades Islands, especially Delos. This little island, uninhabited today except by a few shepherds and the custodian of the excavations, is rich in archaeological interest—temples, a theatre, and a house with a mosaic floor, and the fragments of a very old colossal statue of Apollo which stood in the sacred precinct near the Apollo temple in the days of the Delian League. If you climb to the top of Mount Kynthos you can see other islands of the group round about, including Naxos, the largest and most fertile, and Paros, still famous for its marble.

Side by side with the antiquities of Greece you will often find Byzantine churches, medieval



monasteries of the Greek Catholic Church, and ruins of "Frankish" castles, erected in the days following the Crusade of 1204, when barons from western Europe ruled parts of the land. In 1829 some 300 of the smaller monasteries were suppressed.

There are still scores of monasteries in Greece, and in travelling about you will often seek the hospitality of the monks instead of putting up at doubtful inns—even in Thessaloniki (Salonica) the "queen city of the Aegean." The monasteries of Athos are world famous, and the Meteora in Thessaly the most curious.

The Greek Orthodox Church, although nominally under the Patriarchate of Constantinople, now Istanbul, is really a free national Church. Its growing separation from the Roman Catholic Church, arising in part from differences of

GREECE



ANCIENT PATRAS, CHIEF PORT OF GREECE

EN A

Still a busy and thriving town, engaged today mainly in the export of currants and other fruits, Patras traces its history to the dawn of time. Traditionally founded by Eumelus, who was taught by Triptolemus how to grow grain, it has belonged in turn to Greek, Roman, Christian Crusader, Venetian, Turk and Greek again. It is beautifully situated at the foot of a towering mountain range on the side of which can be seen the medieval castle, its cathedral is dedicated to St Andrew

language and civilization, became definite in 1054. Apart from the refusal of the Greek Church to recognize the supremacy of the Pope, there are other differences—marriage allowed to Greek priests (forbidden to Roman Catholic clergy), use of leavened instead of unleavened bread in the Mass, a slight difference of doctrine concerning the Holy Ghost, etc.

In addition to the Greek-speaking element of the population, which represents the parent Greek stock much changed by Slavic and other foreign mixtures, Greece today is inhabited by two other wholly distinct racial groups. All over the Attic plain, in Corinthia, Argolis, and various other parts, are found the Albanians, who are chiefly farmers. They are a vigorous and manly race, who make excellent soldiers and sailors and have furnished many famous leaders to the kingdom, though they are less quick-witted than the true Greeks. The Vlachs, who are found chiefly in the mountains of Thessaly and central Greece, are for the most part nomad herdsmen or carriers, descended from the Latinized population of Roman times, they still speak a language which indicates its Latin origin.

More than half the people are employed in agriculture and kindred pursuits. More than half of the arable area is devoted to stock-raising, chiefly sheep and goats, as of old. One-fifth of the mainland is still forest land.

The methods of agriculture are still for the most part of the primitive kind. In many places the old wooden plough—precisely as it was 2,500 years ago—is still employed. The use of fertilizers and rotation of crops are rare, and the fields are generally allowed to lie fallow in alternate years. The result is that Greece imports much of its food, especially cereals.

The absence of good native coal has held back manufacturing, though textiles, leather goods, soap, paper, glass, and some other articles are made, in addition to olive oil and wine. Currants, i.e., the small dried grapes shipped from Corinth (the word "currant" is a corruption of Corinth), are still among the most valuable exports. Shipbuilding is carried on at all the ports, for a large part of the nation's wealth comes from its carrying trade. The Greeks are shrewd traders, and they take a large share of the commerce of the Mediterranean region.

The GLORIOUS ART of OLD GREECE

Thousands of years have not dimmed the "glory that was Greece," and the major part of that glory lies in her superb art, the like of which the world has never produced since

Greek Art. Greece is one of the fairest lands in all the world, nowhere else has Nature brought together the charm of mountains and



ANCIENT ATTIC VASE

sea and sky in more beautiful combination. The firm lines of mountains and crags outlined in the crystal-clear air against the brilliant blue of the sky must have helped to inspire that love of simple graceful line, of perfect proportion and symmetry, of strength and serenity, which is so characteristic a feature of Greek architecture and sculpture.

Responding to the beauty that was everywhere about him, the Greek aspired to make his mind and his body harmonious and beautiful. It is impossible to measure how much the sculptor owed to the Greek emphasis on physical culture and athletics. And Nature endowed the Greeks in another important way, for many of the islands off the coast, notably Paros, are almost solid blocks of white marble, while in Attica the quarries of Mount Pentelcus and Mount Hymettus also yield an abundance of the beautiful white stone.

But cold white marble alone did not satisfy the Greeks. They used colour in both their sculpture and their architecture, though time has almost entirely washed away the reds and blues and other bright hues with which they touched up their work, and we can only imagine what the effect must have been when those works were in their prime. The work of the great Greek painters also

has disappeared, it was doubtless as fine as their sculpture, but lives only in what the ancient writers tell us about it, and in the work of their disciples of a later day. Polygnotus in the 5th century B.C., we are told, was renowned as a draughtsman, while the great painters of the 4th century B.C.—Parrhasius, Xeuxis, and Apelles—were famous as colourists.

Fortunately many Greek vases have been preserved in tombs and in other sites uncovered by modern excavators. Simple and graceful in form, these vases show, in the earliest specimens, geometric designs, then figures of men and gods, painted in black against the natural red of the clay, or, as later became more common, with the figures left red against a black background. From these vases we are able to form some idea of what Greek painting was like, and they give us further examples of that wonderful feeling for form and line which made Greek art supreme.

We must not imagine that Greek art sprang full-blown into being. The ancestors of those artists, who were to create the most perfect forms of sculpture that the world has ever seen, were a semi-barbarous people when they began

to migrate into the peninsula that is now Greece, and centuries rolled by before their genius flowered into the art forms which have been the admiration of later times. Though they must unconsciously have been influenced by the art of the Aegean peoples, whom they overwhelmed, no relation can be traced between the well-wrought figures and reliefs of Tiryns and Mycenae and Knossos, and the crude beginnings of Hellenic sculpture in the 7th century B.C.

When we see how primitive and stiff are the Greek statues of that archaic period, and compare them with the masterpieces



GREEK VASE PAINTING

The quaint paintings with which the ancient Greeks decorated their pottery are interesting not only for their artistic value but also for the stories they tell. In this one, for instance, dating from about 460 B.C., we see Oedipus answering the riddle of the Sphinx and thus saving his country from destruction at her hands.

Vatican Museum, Rome, photo Allinari

of two centuries later, we cannot but marvel at the rapid development of Greek art when once it got fairly under way. Through the Phoenicians, the great trafficking race of the age, the early Greeks came into contact with the art of Babylonia, Assyria and Egypt. They borrowed many of their decorative forms from these peoples, but transformed them by the fires of their own superb powers.

Greek religion, Greek love of beauty, and a growing spirit of nationality were finding fuller and fuller expression. But it took a storm like the Persian invasion (490-479 B.C.) to arouse the virile young race to great achievements. Having driven out the Asiatic invader, the Greeks suddenly grew, in the 5th century B.C., to full stature. What the Persians had destroyed the Greeks set to work to rebuild. Their poets sang the glories of the new epoch, and Greek genius, as shown in the great creations at Athens, came to full strength and beauty.

It was then, under Pericles, the great statesman and patron of art, that the Athenian Acropolis was restored and adorned with the matchless Parthenon, the Erechtheum, and the other beautiful buildings which crown this hill (See Acropolis, Athens).

There were beautiful temples in other cities of Greece, too, notably that of Zeus at Olympia, which we know from descriptions by the ancient writers and from a few fragments that have been discovered in recent times. A striking feature of Greek architecture is the skill with which the fullest advantage is taken of natural surroundings (For Greek architecture see Architecture).

The 5th century B.C. was made illustrious in sculpture also by the work of three great masters, all known to us in some degree by



AGE OLD ATTIC SCULPTURE

This is an example of the earliest Greek sculpture, found on the Acropolis of Athens. Though modelled in a soft stone in the sixth century B.C., it shows the same dignity and beauty that irradiate the marble work of the Greek golden age.

Acropolis Museum, Athens photo Alinari

surviving works. Myron is famous for the boldness with which he fixed moments of violent action in marble, as in his famous "Disk-Thrower," or Disk-Thrower, which we know through a fine copy preserved at Rome. The "Doryphorus," or Spear-Bearer, of Polyclitus, who worked in bronze, was called by the ancients the Rule, or guide in composition, because it was believed to follow the proportions of the human body with greater perfection than any other work.

But the greatest name in Greek sculpture is that of Pheidias, who expressed in his marvellous works the noblest and loftiest ideals of Greek religion (See Pheidias). It was under his direction that the sculptures decorating the Parthenon were planned and executed, and some of them may have been the work of his own hand. His great masterpieces, the colossal gold and ivory statue of Athena, which stood within this temple, and the similar one of Zeus in the temple at Olympia, have disappeared.

We can, however, form some idea of his genius from the remains of the sculptures of the pediments and frieze of the Parthenon, now preserved in the British Museum and known as the Elgin Marbles, from Lord Elgin, who brought them from Athens in 1801-12 (See Elgin Marbles). These sculptures, in their composition, in their exquisite modelling, and in the noble ideas which they embody, are the greatest surviving works of Greek art.

Another famous work that is believed to belong to the school of Pheidias is the "Aphrodite" of Melos, commonly known as the Venus de Milo, a marble statue now in the Louvre, Paris. It was discovered in the 19th century in the island of Milo, or Melos, one of the Cyclades. Although some think it belongs to a later date, its perfect proportions,

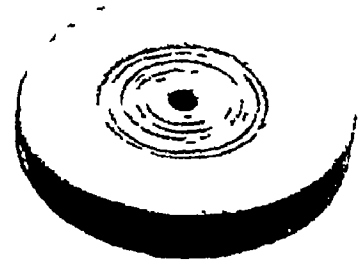
GREEK ART

its calm dignity, and noble serenity typify the qualities which we associate with Pheidias

Pheidias was followed by Praxiteles, Scopas and Lysippus. Of Praxiteles, who has been called "the sculptor of the beautiful," we have an original work, the statue of "Hermes with the Child Dionysus." Most of the sculptors, it must be remembered, are known to us only through copies of their work by Roman artists. The figure of Hermes, at once strong and active and graceful, finely proportioned, having a surface of exquisite texture, the well-poised head and the face expressive of nobility and sweetness, is beautiful beyond description. The child, who is held in the left hand, is reaching out to grasp something, perhaps a bunch of grapes—held in the missing hand of Hermes. The so-called Satyr, or Faun, of Praxiteles, which suggested Nathaniel Hawthorne's romance, "The Marble Faun," is probably the work of another sculptor of the same school. Praxiteles' conceptions are less lofty and dignified than those of Pheidias, but they are full of grace and charm.

Scopas carried farther the tendency to portray dramatic moods, giving his subjects an intense, impassioned expression. Lysippus harked back to the athletic type of Polyclitus, but made his figures lighter and more slender, combining manly beauty and strength. He was at the height of his fame in the time of Alexander the

Great, who, it is said, desired that Lysippus only should portray him. How far this age had advanced in the expression of graceful motion through the modelling of the figure and the skilful handling of the drapery can be seen in the celebrated sculpture known as the "Winged Victory" of Samothrace, now preserved in the Louvre.



GREEK POTTER AND HIS WHEEL

Much of our knowledge of the manners, customs and crafts of ancient Greece is derived from the ornamentations of their pottery. The illustration above (left) is a figure found in Cyprus of a Greek potter modelling on his wheel. The wheel (right), found in Crete is of terra-cotta, and has a central depression in which its pivot was inserted.

British Museum

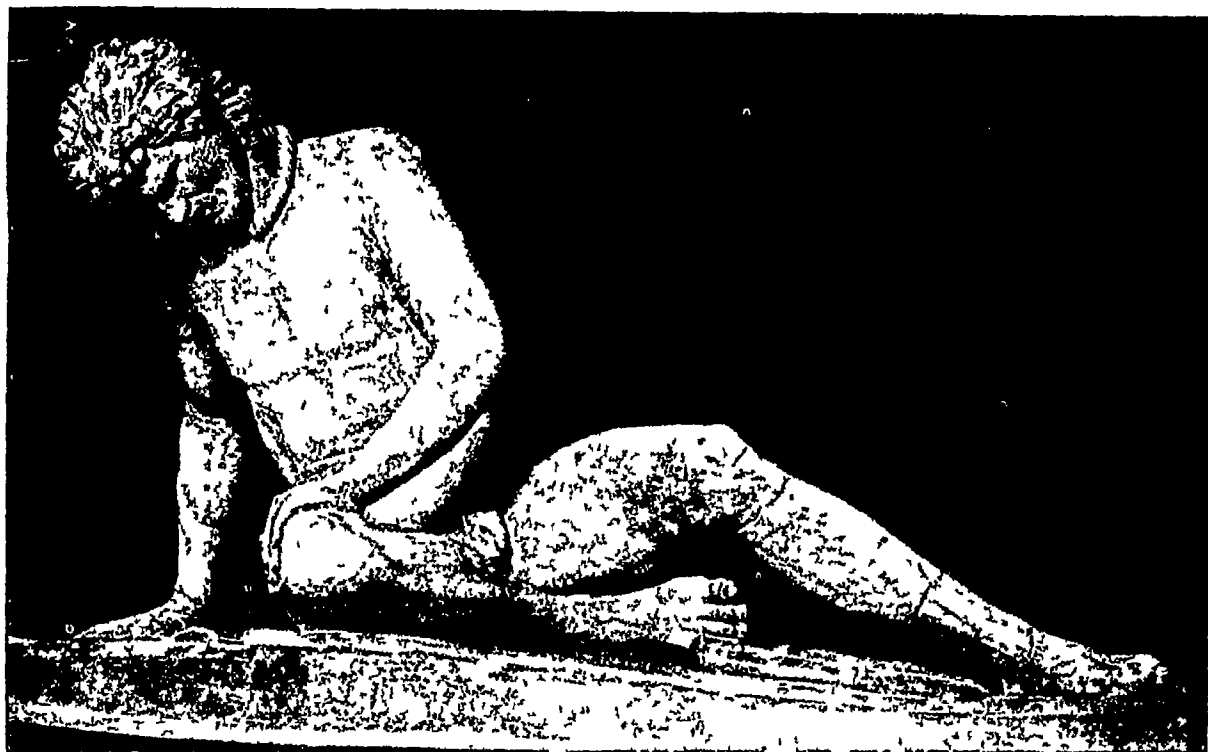
As time went on, Greek art lost much of its simplicity and ideal perfection of form, its serenity and restraint, but it gained in intensity of feeling, in expressing physical suffering and



PART OF THE PARTHENON'S SCULPTURED FRIEZE

The famous frieze of the Parthenon ran round the top of the cella inside the colonnade and high up under the roof. The Greek sculptors were such accomplished masters of their art that they realized that the modelling of the frieze seen from the ground should allow for the awkward angle of vision. They overcame this difficulty by increasing the depth of the relief from below upwards, as is admirably shown in this group of horsemen. This bas relief, together with those shown in pages 1456 and 1457, form part of the Elgin marbles now in the British Museum.

British Museum photo Mansell



THE 'DYING GAUL'—A CELEBRATED GREEK STATUE

Attalus I of Pergamum (241-197 B C) pursued a successful campaign against the Gauls in Asia Minor, and to celebrate and commemorate his victories erected statues of defeated Gauls on the Acropolis of Athens and at Pergamum itself. At the latter place the bronze original of this famous work, the "Dying Gaul," or "Dying Gladiator," was erected. Thus to a boastful king belong our thanks for a great work of art, in which the typical Gaul has been brilliantly represented.

Capitoline Museum Rome photo Anderson

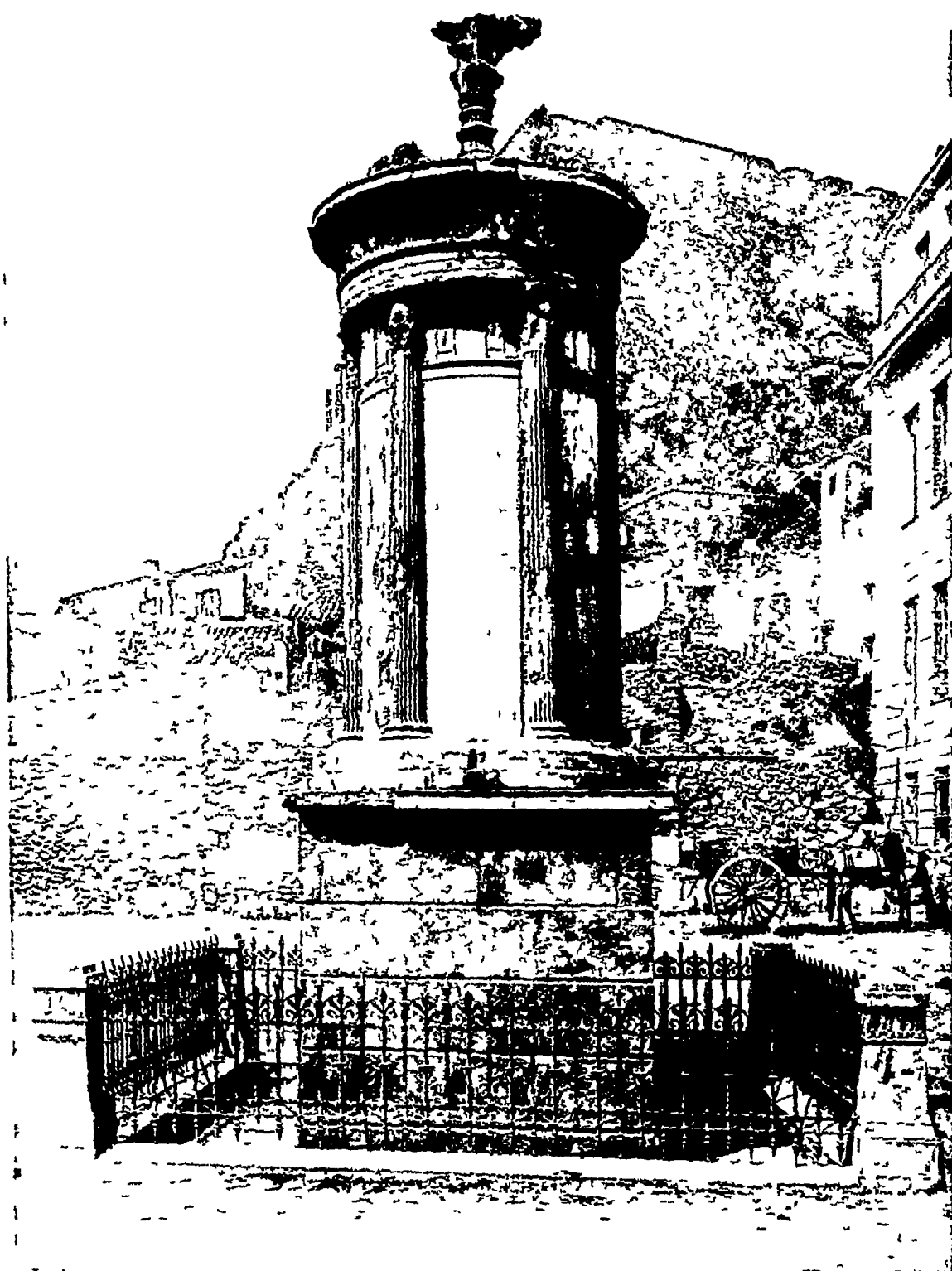
anguish. It had, also, become more realistic, portraying not only ideal types of men and gods, but portraits of individuals, and not only Greeks but barbarians as well. One of the most famous works of the period after the death of Alexander is the "Dying Gaul" sometimes called the "Dying Gladiator." In the "Laocoon" group, which depicts the father and his sons crushed to death by deadly serpents, we find the extremity of physical torture as represented in sculpture. To this period belongs also the famous "Apollo Belvedere," so called from its having been placed in the Belvedere gallery of the Vatican. (See illus. in page 218)

The first and most glorious period of Greek art, as has been seen, commenced in the 5th century B C, following the Greeks' success in repelling the Persian invasion. The great heart of the movement was in Athens, a large part of which had been destroyed, and was rebuilt. The character of the art was its beautiful simplicity, its chaste outline, its restraint, and the ideals it expressed. The second great period was in the 3rd century B C, though even then it was altering in character. This became still more apparent after the Roman invasion, when the sculpture became more emotional. Many beautiful examples of Greek sculpture were taken to Rome, and both Greeks and Romans continued to turn out work in stone in that city.

From that time on, however, it gradually decayed, until classical art appeared to be lost entirely. It was not until the Renaissance period that original and creative art revived once more in Europe. (See also Roman Art)

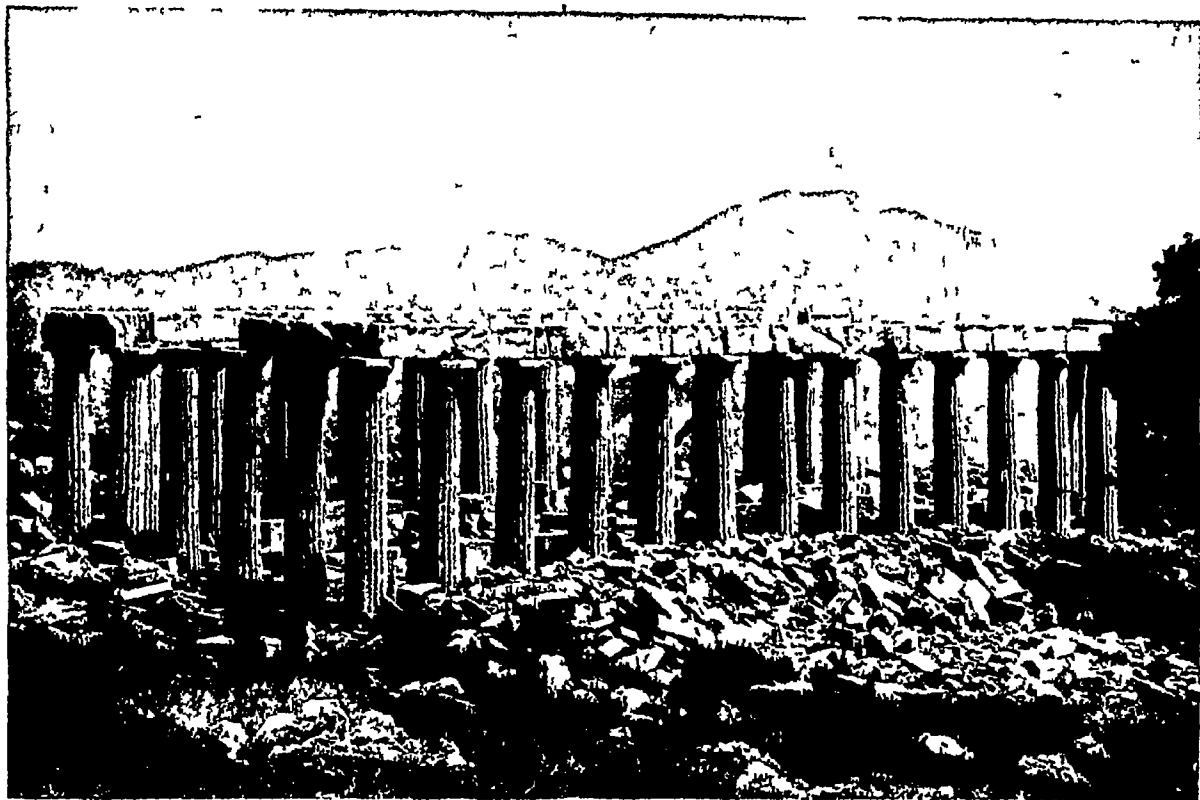
The influence, however, of Greek art has been visible, off and on, for the last two thousand years, not merely in the Mediterranean countries, but also in England. For the style named "Palladian" after the great Italian architect, Palladio, and brought back to England by Inigo Jones (q v), which became typical of the finest English buildings in the 17th century, was itself derived from Greek origins. The use of columns, whether plain or fluted, which became characteristic not only of that architecture, but also of the later work done during the following century and comprising those buildings which we now know as "Georgian," is derived almost directly from the Greek. Wren, again, in his west front of St Paul's, uses Greek columns with outstanding success, and it is no exaggeration to say that most of the finest productions of the finest age of English architecture are directly influenced by the work of ancient Greece. Not only is this the case in England, but in France and Germany, too, one sees ancient Greece providing the model for many a fine building, while in sculpture there has always been no lack of support for work in the classical Greek manner.

THINGS *of* BEAUTY WE OWE *to* GREECE



Lysicrates son of Lysitheides of Cleynna was choragus (i.e. instructor of the chorus) when the boys of the tribe of Acamantis conquered so reads the inscription round the architrave of this lovely little monument actually a temple to Dionysus Erected in Athens by Lysicrates to celebrate his team's victory in the theatrical contests held during the feast of that god it is a most graceful and pleasing example of the Corinthian manner distinguishable by the acanthus leaf decoration on the capitals

DORIC SOLIDITY AND SLENDER IONIC



The temple of the "Wingless Victory" (Athene Niké), in the lower picture, is one of the greatest glories of the Acropolis of Athens, and a superb miniature work in the Ionic style. Notice the capitals, and compare them with those of the Corinthian monument (page 1961) and the Doric temple (top). This Doric temple, which is at Bassae, near Phigalia, in Arcadia, was designed by Ictinus, architect of the Parthenon, and is one of the finest of all the remains of ancient Greece.

Photos top E. P. Co. bottom Prof. Rossmann (th)

CARVED FIGURES FROM THE ATHENIAN ACROPOLIS



Here you see what the Athenian ladies wore during the 6th century B C for it is from that time that these two sculptured figures date. The one on the left, slightly the earlier of the two, was done in soft stone which accounts for the rather clumsily rounded contours of the figure. The far finer work of the right-hand figure is due to the introduction of marble, which can be carved with greater accuracy and sharpness. There is too more opportunity for artistic expression when marble is employed.

Alinari

THE ATHLETE IN ACTION AS MIRON SAW HIM



Anderson

Finest of the various versions of this magnificent sculpture, Miron's Discobolus (now in the Vatican Museum at Rome) shows all that is best in Greek art of the great period. Never since that time has a direct representation of an actual subject been so perfectly portrayed, for here is no distortion to aid design, no false emphasis in order to achieve effect. It is the perfect representation of the athlete in a pose assumed naturally as he prepares to throw the discus, a sport peculiarly suited to showing off free muscular movement.

PRAXITELES' HERMES, A MASTERPIECE IN MARBLE



In this glorious statue we are fortunate enough to have the original sculpture described by the writer Pausanias and even in the days of the Athenian republic admired as a masterpiece. You see the god Hermes who was in the original work dangling a bunch of grapes to amuse his infant brother Dionysus. This sculpture done in Parian marble and discovered at Olympia was the work of Praxiteles perhaps the greatest of all the sculptors of ancient Greece. It is now in the museum at Olympia.

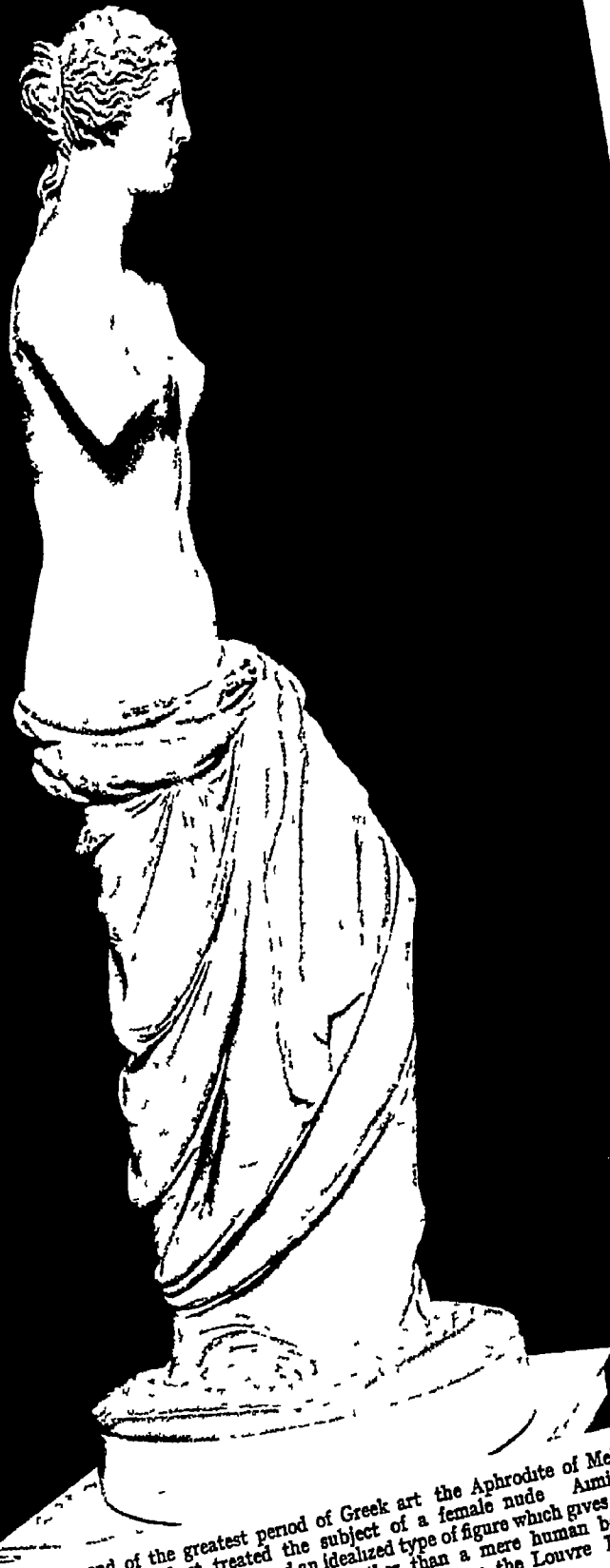
DIGNITY AND FEELING IN A GREEK BRONZE.



Allnati

Greek-bronzes are far less common than sculptured pieces, and this example is one of the greatest of all extant examples of this art. Found at Delphi, where it is still housed in the museum, it shows us a charioteer, reins in hand, standing erect and immobile as he guides his horses. The simplicity of the whole work in no way detracts from its greatness, and does in fact emphasize the intensity of expression which is one of its greatest qualities.

IDEALIZED WOMANHOOD PORTRAYED AS GODDESS



A work from near the end of the greatest period of Greek art the Aphrodite of Melos seen in this picture shows how the Greek sculptors best treated the subject of a female nude. Aiming at more than a mere representation of feminine beauty they produced an idealized type of figure which gives us still over two thousand years later the impression of a goddess in marble rather than a mere human being. This glorious work (better known as the Venus de Milo) is now in the Louvre Paris.

W. F. Maseell

PAINTED WARE OF GREEK POTTERS



These two vessels give some idea of the heights to which the potter's art rose in ancient Greece, and especially in Attica where this art was practised with the greatest success. That on the left is especially interesting for it is of a type, having coloured figures on a band of white ground, which was principally reserved for vessels to be placed in tombs. It shows a Greek woman seated on a *diphros*—a sort of stool—and is probably an oil-jar (*lekythos*). The other vase (above), of the better-known red-figure ware, shows a truly typical Greek subject—a warrior for whom the figure of Victory is pouring out wine, her wing and the wine-vessel are visible on the right. Both these vases are in the British Museum.

Left photo, Mansell

The Classic TONGUE of Ancient GREECE

One of the loveliest languages of the world, and one in which the world's finest literature and noblest thoughts have been composed, is Greek From Greek literature all that is best in modern letters is derived

Greek Language and Literature.

If by some happy miracle Plato and Demosthenes could wander back from the Elysian Fields, and sit down in some café of modern Athens, they would probably be surprised to find how easily they could read the morning paper Of course, it would take them a minute or so to focus their eyes on the print, which is so much smaller than anything done with the reed-pen of their day, and they would find the shape of some of the letters changed

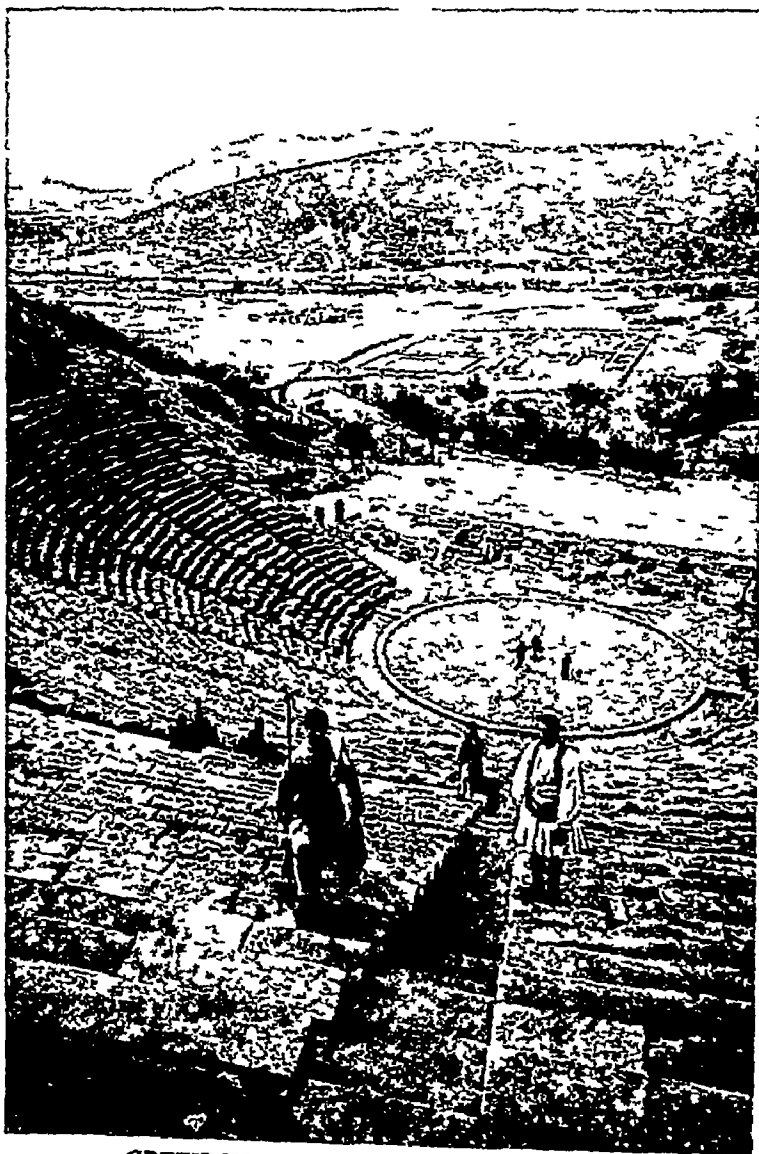
They would find many new words, and, perhaps, they would accuse the journalist of careless grammar But, all the same, the literary Greek of today is perfectly intelligible to anyone who knows his Greek of 2,500 years ago Their greatest trouble would be in such everyday things as ordering breakfast and talking with ordinary people For many words concerning the intimate things of daily life were borrowed during medieval and modern times from the Italians, Turks, or other neighbours, and the pronunciation is so changed as to make modern spoken Greek almost unintelligible to one who knows only the classical tongue

Greek, nevertheless, should be considered not as a dead language but as a living one The Greek schoolboy can read the literary masterpieces of 2,500 years ago far more easily than we can read Chaucer And the Greek language is living not only among modern Greeks, but in the present day speech of Great Britain and the rest of the world When we want to make a new word for a new thing we are likely to borrow from the Greek For example, "photograph," "telegraph," "telephone," "gramophone," "periscope," and scores of other words that have found their way into our dictionaries as names of modern inventions, are formed directly from old Greek words

Nor are we indebted to Greek for words like these only Many, also, are woven into the

very warp and woof of our language So, if you know Greek, you can often see at a glance the meaning and pronunciation of a word that would otherwise make you gasp—"anthropomorphic," for instance, comes from the Greek words for "man" and "form," meaning therefore "man-formed" or "man-like"

But even if Greek were as dead as Sanskrit from the point of view of modern life, still it would be worth while for us to study it For of all the languages of the world, the most



GREEK THEATRE SPLENDID IN RUIN

The wonderful ruins of the great Greek theatre of Epidauros justify the praise bestowed upon it by Pausanias, who said it was the most beautiful in Greece It accommodated an audience of over 16,000 people, and almost every seat remains as it was originally, though of the stage only the foundations survive. In the front of the auditorium are marble seats for the favoured few

GREEK LANGUAGE & LITERATURE

beautiful is Greek as it was written 20 centuries or more ago. It was graceful and harmonious, full of light and shade and colour, subtlety and music. It could pile words together into compounds as German does nowadays—only the words were more musical to begin with—or it could sail along with little words like a lightly-moving skiff.

Greek Books in Translation

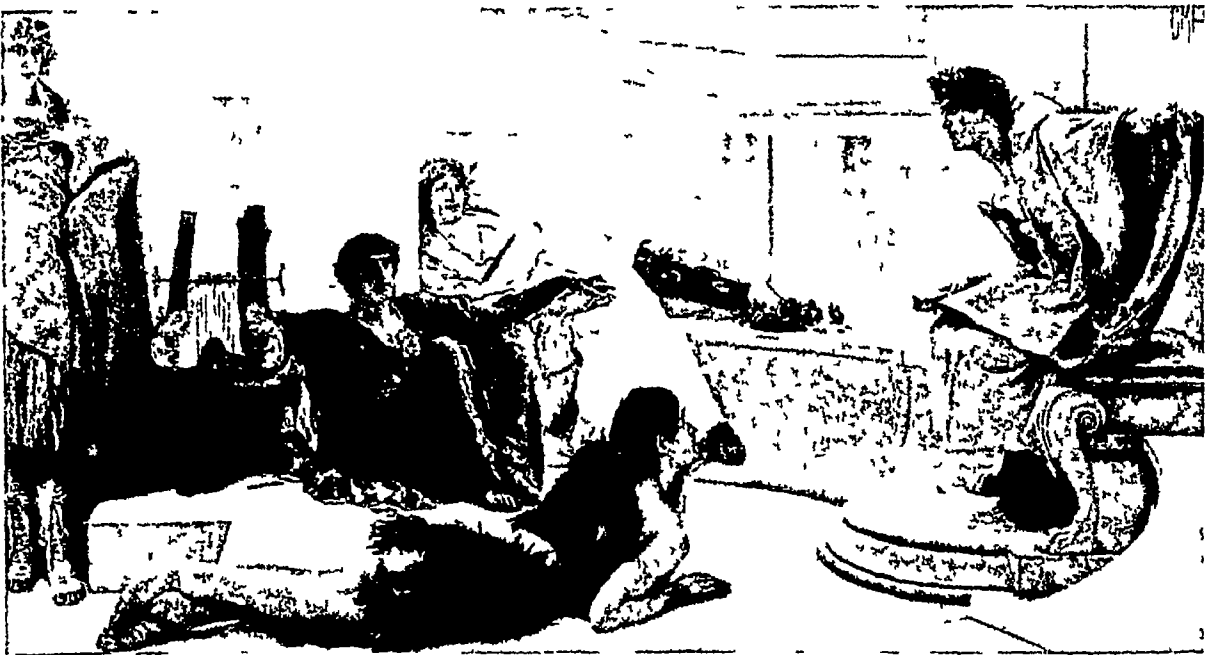
Moreover, in this superb language was written one of the most wonderful literatures of all time. Of this literature we can get only half an idea through even the most careful translations. Poetry is always difficult to translate, but Greek poetry loses more, perhaps, than any other, since English often takes two or three times as many words to say the same thing. A prose translation of Homer is therefore clumsy, and a translation in English verse is incomplete. Neither gives any idea of the simplicity and resonance and movement, the inevitability which never becomes monotony. Gilbert Murray has been perhaps the most successful in accurately rendering the spirit of the old Greek dramas in English verse of exquisite limpidity. The lyrics are even harder to translate, though Swinburne and Tennyson have produced free renderings of great beauty which give the English reader some notion of the qualities of the originals.

Greek prose also loses much by translation, for Greek is so much subtler an instrument of expression than English that you would need a footnote to almost every word of a translation to explain the exact shade of meaning that your

Greek author intended. The Greek "particles," for instance, little words only a letter or two long and amounting only to a slight gesture of the hand or the flicker of expression on a person's face, must be translated in English by some such awkward word as "moreover." A translation makes things tedious where the Greek expresses them compactly. This is because Greek is a rather highly "inflected" language. A single word of, perhaps, no more than two syllables, in Greek, may become a whole sentence with us.

The oldest Greek literary works that we have are the *Iliad* and the *Odyssey* of Homer, which the world still acknowledges as the most splendid examples of epic or narrative poetry. People used to wonder how such early poems could be so perfect and so great as the *Iliad* and the *Odyssey*. The explanation is that these were not the first poems of the Greeks. They come from an age that was already rich in "folk" poetry—hymns to the gods, and marriage hymns, and lays telling the deeds of ancient heroes.

In that age, however, the Greeks had no writing, and of all the songs that the wandering bards carried from city to city and recited from memory, none but the Homeric poems survived to be written down. The only exceptions are a few of the so-called Homeric hymns—the invocations to Apollo or some other god, with which it was customary for the singer to prelude his recitation of the Homeric stories themselves. The article on Homer tells you about these thrilling tales of adventure.



READING HOMER IN THE GREECE OF LONG AGO

The two great epic poems of Homer, the *Iliad* and the *Odyssey*, were never written down by the author to whom we give the name of Homer, indeed, we know nothing about him, except that he probably lived about 1,000 years before Christ. These great poems were handed down through word of mouth, and they were first produced as a complete edition about 150 B.C. Here a famous modern artist Sir Lawrence Alma-Tadema, has depicted a reading of Homer's poems in the palmy days of Greece.

GREEK LANGUAGE & LITERATURE

From a slightly later period we have the poems attributed to Hesiod. Hesiod is a much more definite figure than Homer. He lived at the hamlet of Ascra, near Mount Helicon in Boeotia, probably in the 8th century B.C. and drew many faithful pictures of the country life he knew so well. Homer and Hesiod together made a sort of Bible for the Greeks—Homer telling the story of the heroic past, and Hesiod dealing with the practical realities of daily life, setting forth homely maxims and precepts for the farmer in his 'Works and Days,' and in the 'Theogony' piecing together the old legends to form a systematic account of Creation and the gods.

With the 8th and 7th centuries we come to the beginnings of the historical period. The old ways of life were giving way to new. Commerce, discovery, colonization and political change widened the horizon of the Greeks and quickened their feeling and imagination. To express the thoughts and feelings aroused by this fuller and more interesting national life, new literary forms were invented—all still in verse, however, for prose had not yet begun to be used as a literary medium.

Instead of the rapid flowing 'hexameter' (a line of six feet) so admirably adapted for narration, the poets of the 8th and 7th centuries used the metre called

"elegiac" which lent itself to direct expression on almost any theme—patriotism, war, mourning, or political reflection—and the "iambic" metre, which was especially adapted to pointed personal utterance, usually of a satirical nature. With these forms are associated such names as Archilochus, Mimnermus and Solon the great



A SCENE FROM GREEK TRAGEDY

This painting by a modern German artist interprets a moving scene in the play 'Oedipus at Colonus' written by that great tragic poet, Sophocles. The blind old Oedipus, formerly king of Thebes, but now a wanderer on the face of the earth, has just addressed to his daughter Antigone the opening line of the tragedy: 'Child of a blind old man, Antigone, what country reach we?'

a pleasure which alone is enough to recompense him for the labour of learning the Greek language. Sappho, who wrote about a century before Pindar, is generally esteemed the greatest of all women poets.



RECONSTRUCTION OF A SCENE FROM ARISTOPHANES

Here is an artist's reconstruction of a scene from one of the best-known of Aristophanes' comedies, "The Birds." In it, the birds are persuaded to build a city half-way between heaven and earth, so as to force the gods to treat with them in order to maintain contact with men. There was, as you can see, considerable realism in Greek drama, and the bird-characters in particular are acted in much the same manner as they would be in a modern version.

how each made improvements in the dramatic form, is told in the article on Drama.

From Greek comedy only the plays of one man have survived—those of Aristophanes (*qv*), who was for 40 years "the great burlesque critic of Athenian life." His comedies are gay fun-making about the things of his own day, always from the standpoint of the conservative.

As always in literary history, Greek prose was late in developing. In the 6th century some of the early philosophers formulated their ideas in brief prose maxims, but the first truly literary use of prose is in the "History" of Herodotus, written about the middle of the 5th century (See Herodotus). The theme of Herodotus is the struggle between East and West, ending in the Persian wars. His great successor, Thucydides (*qv*), told the story of the Peloponnesian War. Thucydides' critical use of sources, his inclusion of documents, his laborious research into the cause and origin of important events, make him the most modern of the Greek historians, far removed from the romantic inclusiveness of Herodotus or of Xenophon (*qv*).

The 5th century also saw the rise of another prose art, the art of oratory, with its companion art of rhetoric, which taught the technique of

making successful speeches. With the establishment of democracy in Athens and other Greek cities, the ability to make convincing speeches, and especially in the law courts, soon became of the greatest practical value.

Litigants were usually compelled to plead their own cases, instead of hiring others to plead for them, so rhetoric became part of the ordinary education of the youth, and a new profession arose—that of the writer of speeches for men to speak in their own behalf. A large proportion of the speeches of the Attic orators that have come down to us were meant to be used in this way. The 4th century B.C. was the golden age of oratory, made memorable by the polished speeches of Lysias, Isocrates, Aeschines, and the master orator, Demosthenes (*qv*).

The same lively curiosity and interest in the spectacle of the universe which led the Greeks to invent epic and lyric verse, drama and history, also made them the first philosophers. Their craving to find a reasoned answer to the riddles of life resulted in the creation of another department of prose literature, represented chiefly by the great names of Plato and Aristotle.

Beginning with the 6th century, one thinker after another advanced his theory of the

material causes of the basis of the universe, of knowledge, and of conduct. Many of the fragments of their teachings, which have been preserved in the form of terse, epigrammatic statements in prose or verse, seem crude and childish to us today, but they serve to remind us how long and toilsome is the road that leads to wisdom.

The first thinker to lay a really scientific basis for philosophical inquiry was Socrates (*qv*), whose tireless questioning into the roots of conduct and searching criticism of all traditional doctrines so outraged the orthodox and narrow-minded that he was put to death. He wrote nothing himself, but his great pupil Plato (*qv*), carried on and developed his teaching in a matchless series of dialogues, packed with fresh and stimulating ideas which have inspired every philosophical thinker since his day.

Third of the immortal trio of Athenian thinkers was Plato's pupil, Aristotle (*qv*), the father of science. Aristotle sought to map out nearly the whole field of human knowledge into the various sciences, laying a foundation for all later scientific inquiry. In the history of literature, his work cannot rank with the superbly artistic Platonic dialogues, but in the history of thought he is acknowledged as "the master of those who know." Theophrastus, who succeeded Aristotle as head of the school called the Lyceum, is chiefly remembered for a series of lively character sketches which have found imitators in every age.

With these names the story of classical Greek literature ends, but the Hellenistic age in Alexandria offers us a second rich store of literature (See Alexandria, Egypt). The name that stands out in poetry is that of Theocritus (3rd century B.C.), who wrote exquisite pastoral poetry picturing the rural life of his native Sicily. Imitators from Virgil to those of our own day have tried in vain to recapture the charm of the pastoral form as Theocritus first used it.

Other poets of this age are the lyric poet Callimachus, Bion and Moschus, writers of pastoral verse, and Apollonius Rhodius, who wrote the "Argonautica," an epic in four books on the quest of the Golden Fleece. Greek prose, too, continued to flourish far into Roman times, and from these later days we have our first forerunners of the modern novel, as well as important works of geography and history.

The most noteworthy of these later writers are the historians Polybius, Diodorus Siculus, Josephus and Appian, the geographers Strabo and Pausanias, the biographer Plutarch (*qv*), who has given us more general information about antiquity than any other single writer, the critic Longinus, the supposed author of one of the best of all works of literary criticism, the treatise "On the Sublime", the humorist Lucian, whose "Dialogues of the Gods" are

almost as outrageously laughable as a comedy of Aristophanes, and the two Stoic philosophers Epictetus (*qv*) and Marcus Aurelius (*qv*), one a slave and the other an emperor.

In various localities the Greek language was spoken and written with variations sufficient to cause three chief dialects to be recognized. The Ionic dialect, the language of Homer and Hesiod, was spoken in most of the Aegean islands and on the west coast of Asia Minor. With a few modifications the Ionic is identical with the Attic, the chief literary dialect. The Doric, the language of Pindar and Theocritus, was spoken at Corinth and throughout most of the Peloponnesus. The Aeolic, in which Sappho wrote, was the speech of Boeotia, Thessaly, and Aeolis (northern Asia Minor). The Greek of the New Testament, Hellenistic Greek, differs only slightly from classical Greek.

In modern Greece there is a sharp cleavage between the dialect of the people, called "Romaic," and the literary language, which represents an attempt to return as far as possible to the standards of classical Greek. The style of most of the current literature and journalism of Greece represents a compromise between these two ideals, but the most powerful poetry and fiction are written in the "vulgar" tongue.

Greenland. This immense continental island, which lies to the north-east of Canada and almost wholly within the Arctic Circle, is nearly completely covered in an impenetrable winding sheet of ice thousands of feet deep,

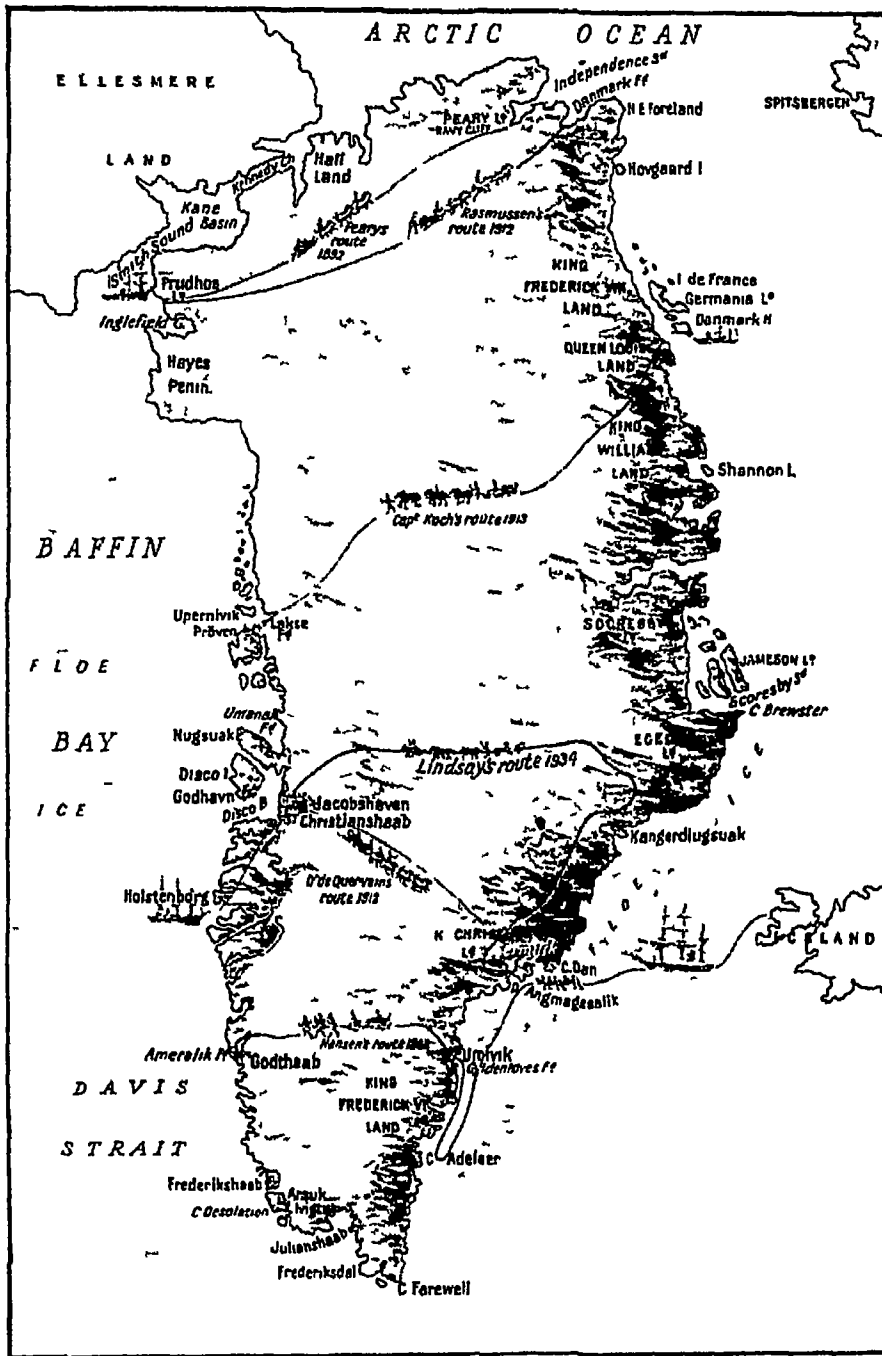


GREENLAND'S RUGGED SCENERY

This photograph gives some idea of the scenery in the interior of Greenland. A torrent rushes down the mountain side between masses of rock while in the pool which it feeds a fisherman follows the primitive method of spearing fish.

Photo Danish Legation

GREENLAND



HOW GREENLAND WAS EXPLORED

This map shows how the interior of Greenland was gradually explored after the first landing of Eric the Red in the 10th century. The centre of the country is one vast glacier, and the bold explorers had sometimes to face a temperature of 90° below zero. The British Arctic Air Route Expedition crossed from Angmagssalik to Ivigtut in 1931. Fridtjof Nansen in 1888 was the first to traverse the ice-cap, travelling from east to west.

woven of the snows of countless centuries. Its narrow rocky shores are fringed with ancient worn-down mountains (some more than 10,000 feet high) and deeply cut by fiords and valleys. A chain of mountains in the vicinity of Scoresby Sound was discovered in 1933. Greenland is the second largest island in the world, with an area now estimated at 736,000 square miles. Only 31,000 square miles of this total are ice-free. Its length is about 1,600 miles and its breadth from 700 to 800 miles.

The island belongs to Denmark and its government is vested in a commission at Copenhagen. The east coast is almost uninhabited because of a cold current, but the west coast is warm enough to permit the growth of a narrow belt of green tundra, and some 15,000 natives live there. Life in this wilderness is a simple isolated one for its inhabitants, the hardy Eskimo and the few hundred Danes and half-breeds, who live with their dog-sledges and *kayaks* (sealskin-covered boats) in the stone or snow-hut settlements along the coast.

In the uncertain climate of fogs and snows and icy winds (bitterly cold in the sunless north, but in the south-west often mild enough to breed mosquitoes), these people live an outdoor life hunting the seal, whale, walrus, bear and fox, and fishing for salmon, cod and halibut. Commerce is with Denmark, and the state-controlled trade is carried on chiefly by the barter of the principal exports—whale and seal oil, cured fish, eiderdown, and skins. Cryolite is also mined and exported. This is a light, brilliant mineral used in making soap, soda, salts, aluminium ware, and a fine quality of glass. Coal, copper, gold and iron have been discovered.

From "Greenland's icy mountains" comes the glacier sheet that discharges into the sea every year more than 1,000,000,000 tons of ice. Many of these glittering icebergs are carried down into the lanes of travel. (See Icebergs)

Greenland was named by the Norwegian, Eric the Red, who about the end of the 10th century reached its south-western coast and founded a colony. Communication with Norway ceased in 1410, and Greenland became lost to the world until the close of the 16th century, when it was

rediscovered by English explorers Greenland was "in the news" in 1931-2, when a British expedition explored the ice-cap with a view to the future establishment of an air service to Canada. The leader, H. G. Watkins, was drowned while paddling a *layak* (native canoe).

Gregory. POPES This honoured name has been borne by sixteen popes.

GREGORY I, called the Great (540-604), was a Roman of old family and great wealth, who became a monk in the monastery of St. Andrew at Rome, which he himself endowed. His interest in the Roman island of Britain was aroused by seeing some beautiful English boys sold as slaves in the market place at Rome. Their blue eyes and golden hair attracted his attention, and he inquired "Whence come these fair youths?" On being told that they

were Angles from the province of Deira, ruled over by Aella, he replied "Truly, they should be called angels, and not Angles, for they have the faces of angels," and, continuing to play upon the words of the answer, declared that the country should be saved from the wrath of God (*de ira Dei*) and that Alleluia should be sung in Aella's kingdom. After he became Pope in 590, he sent St. Augustine as missionary to England to convert the people from their heathenism. Gregory defended Rome against repeated attacks of the Lombards, and exercised much of the power in the West which had fallen from the hands of the weak Eastern emperors. As a teacher and a theologian, he summarized and defined more clearly the doctrines of Augustine (of Hippo), laying the foundations of the Scholastic system. In the realm of liturgy and church music his name is still commemorated in what is called the Gregorian Sacramentary, and in the plain chant which became pre-eminently the music of the Church. He died March 10, 604.

GREGORY VII (c. 1025-1085) was the mighty Hildebrand. After being the power behind the throne for a quarter of a century, under five popes, he himself was chosen Pope in 1073. His pontificate is memorable for the beginning of the great Investiture Conflict with the Emperor Henry IV. His purpose was to create a sort of "League of Nations," with the Pope at its head.

A Catholic historian sums up Hildebrand's ideas in these words: "Seeing the world sunk in wickedness and threatened with impending ruin, and believing that the Pope alone could

save it, he conceived the vast design of a universal theocracy, which should embrace every kingdom of Christendom, and of whose policy the Ten Commandments should be the fundamental principle. Over this commonwealth of nations the Pope was to preside. The spiritual power was to stand related to the temporal as the sun to the moon, imparting light and strength, without, however, destroying it or depriving princes of their sovereignty."

Henry was obliged to humble himself before the Pope at Canossa (1077). But the struggle soon began again. Henry attacked the Pope in Rome itself, and Gregory, forced to leave Rome, took refuge first at Monte Cassino, and then at Salerno, where he died, May 25, 1085.

GREGORY IX (Pope 1227-1241) is chiefly memorable for his conflict with the Emperor



AN EMPEROR HUMBLING BY GREGORY VII

Henry IV, Emperor of the Holy Roman Empire engaged in a dispute with Pope Gregory VII on account of the Pope's decree against lay investiture. For his opposition to the papal decree Henry was excommunicated, and, though he put up a show of resistance, he was eventually obliged to submit to it. He made his submission to Gregory at the castle of Canossa, arriving there in a snowstorm. One story runs that he had to wait in the snow three days before Gregory would grant him admission.

Frederick II GREGORY XI (Pope 1370-1378) was a Frenchman who instituted many reforms and transferred the Papacy back to Rome from Avignon, where it had been for some 70 years GREGORY XII (Pope 1406-1415) upheld the rights of the Roman pontiffs against the Avignon Anti-Pope Benedict XIII GREGORY XIII (Pope 1572-1585) made the great reform in the calendar GREGORY XVI (Pope 1831-1846) encouraged learning and founded the Egyptian and Etruscan museums in the Vatican

Grenfell, SIR WILFRED THOMASON (born 1865) Labrador fisher-folk will always remember how this doctor-missionary brought comfort and health to their desolate land

Upon his graduation from Oxford University Grenfell entered the London Hospital to study medicine and surgery Having decided to devote his life to missionary work, he believed that practical help in bettering health and living conditions should go hand in hand with religious teaching Among his patients were many seamen, and in 1889 he joined the Royal National Mission for Deep Sea Fishermen, fitting up an old sailing vessel as a mission ship to cruise in the North Sea among the tramp steamers and fishing fleets Within a few years he built a sailors' hospital, a co-operative store, a mill, an orphan age and a school He attracted so much attention by his brilliant success in this unique work that Lord Strathcona, the empire builder and pioneer of railways in Canada, gave him a steel steamer to carry it further

From Lord Strathcona, who in his youth had been a fur buyer in Canada for the Hudson's Bay Company, Dr Grenfell heard of the deplorable condition of the English, Scottish and French-Canadian fisher-folk of Labrador During the short summer months and doctors from Newfoundland visited the fishing villages, but for nine dark months of every year the people were frozen in, with no means of communication with the outside world except by dog-sledge

In 1892, when he was 27 years old, Dr Grenfell went to Labrador, and made that forbidding region the field of his missionary labours He fought epidemics of smallpox, made the villages sanitary, instructed the women in nursing, and took the seriously ill and injured to his hospitals in Battle and Indian Harbours He opened a road along the coast, introduced reindeer herds for their milk and for rapid travel, and started a travelling library Dr Grenfell was knighted in 1927

Finding that Christmas was not being properly kept in this bleak corner of the world, Grenfell made a public appeal for gifts Great boxes arrived in Battle Harbour in the summer, and at Christmas there is a decorated tree in every village church, and a Santa Claus who dashes up in a gay red sleigh with prancing reindeer In all the world there are few more beautiful or more helpful missions than that of this doctor-missionary of Labrador

Grenville, SIR RICHARD (1541 ?-1591) In British history there are few more dramatic events than the last fight of the *Revenge*, which had been Sir Francis Drake's flagship at the defeat of the Spanish Armada, and in 1591 was the flagship of Sir Richard Grenville, Lord Thomas Howard's second-in-command on the Azores and Canaries station The incident is immortalized by Tennyson's poem, "The *Revenge*"

King Philip of Spain, fearing the rising naval power of England, had forbidden his treasure-ships to return from America At last he could delay no longer, because he required the money He, therefore, equipped a strong fleet which was to pick up the Spanish Plate Fleet in mid-ocean and convoy it home Howard had only half a dozen ships, while Don Alonso de Bazan, the Spanish commander, had a fleet of fifty-three vessels under him

While Howard was watering his fleet in Flores Bay, Azores, a pinnace put in with a warning from the Earl of Cumberland, who was then attacking commerce off the Spanish coast, to the effect that



SIR WILFRED GRENFELL

One of the most famous of modern medical missionaries is Sir Wilfred Grenfell, who from his work among the fisher-folk of Labrador has come to be known as "Grenfell of Labrador" This photograph shows him leaving his home for a round among his patients



GRENVILLE'S LAST FIGHT ON THE REVENGE

In this picture the artist has given a realistic impression of the fight of the Revenge. It shows the last moment of the battle, when Sir Richard Grenville's flagship was dismasted, but, surrounded by the ships of the Spanish fleet, kept her flag flying at the stern. It was not until only 20 men out of the original ship's company of 150 were left to serve the guns, while the admiral was mortally wounded, that she surrendered.

After O. B. Brerly

Don Alonso was approaching. The information came at the eleventh hour.

When Grenville was ready to clear, the Spaniards were between him and Howard. Despite the entreaties of some of his officers, he steadfastly rejected their counsel to run before the wind, "utterly refusing," according to Sir Walter Raleigh, "to turn from his enemies, alleging that he would rather choose to die than to dishonour himself, his country and her Majesty's ship."

Grenville played a hero's part. He would "pass through the two squadrons in spite of them, and enforce that of Seville to give him way." The first galleon to meet him was the San Felipe, which got to windward and took the breeze out of his sails.

The fight began at three o'clock in the afternoon and was continued throughout the night. "Fifteen naval armadas," writes Raleigh, "were brilliantly repulsed by this one English ship, which received in the course of the action eight hundred shot of great artillery, besides many assaults and entries." Grenville was wounded twice, but refused to go below.

At length, his ship leaking like a sieve, her masts gone by the board, the upper deck torn away, and forty dead, Grenville ordered the master gunner to be prepared to blow up the battered hulk with the remaining barrel of gunpowder. Then he addressed those of the crew who were still unwounded, saying that

"as they had, like valiant, resolute men, repulsed so many enemies, they should not now shorten the honour of their nation by prolonging their own lives by a few hours or a few days." The master-gunner readily agreed, and so did several of the others, but the captain and the master were of another opinion, and besought Sir Richard to have care of them.

The master of the Revenge was then rowed to Don Alonso's flagship, and the admiral agreed that the officers should be released on payment of a ransom. As Grenville was borne away from the Revenge he fainted, but shortly afterwards recovered consciousness, only to die later on board the Spanish flagship.

"Here die I, Richard Grenville," he is stated to have muttered with his dying breath, "with a joyful heart and a quiet mind, for that I have ended my life as a good soldier ought to do, who has fought for his country, queen, religion and honour. But the others of my company have done as traitors and dogs."

Two Spanish ships had been sunk, another had to be beached, and the fourth was a wreck before the Revenge was abandoned. Of Philip's Plate Fleet over a hundred foundered or were wrecked in a gale forty-eight hours later.

Grey of Fallodon, EDWARD, 1ST VISCOUNT (1862-1933) Sir Edward Grey, as he then was, having succeeded to the family baronetcy in 1882, held the post of Foreign Secretary when Great Britain declared

GREY

war on Germany in 1914, and by his honesty, his quiet dignity, and because he exemplified much of what was best in the national character, he won not only the respect but the complete confidence of the British nation. This respect was increased by his rare public appearances after his retirement, and by the courage with which he faced the possibility of blindness. Happily, in his later years, his eyesight improved.

A Great Gentleman

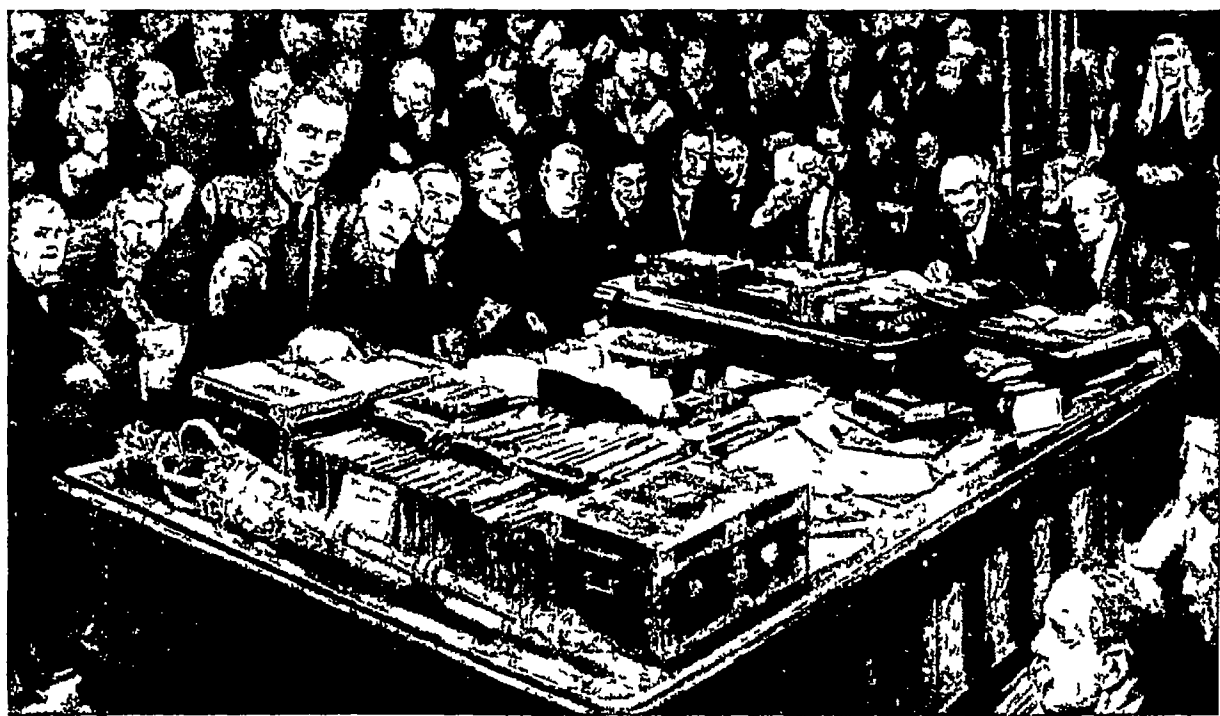
As Foreign Secretary Grey was handicapped by a certain insularity of outlook—his knowledge of foreign languages was elementary—and, more fatally, by his constitutional dislike of making decisions. His strong position with the Liberals was due to an appearance of strength, to a certain reserve, especially in speech, and still more to a constant and obvious indifference to office. Throughout his career he remained a country gentleman, a genuine lover of Nature. A little remote, in his beloved Fallodon, from post-War conditions, he yet seemed in his retirement, to the average Englishman, to have stamped his character on the public life of the country. If not a great statesman, he was a great gentleman.

Edward Grey was born April 25 1862. When he first entered Parliament as Liberal member for Berwick-on-Tweed in 1885, he was known as the amateur champion of tennis and a keen fisherman, but he showed little political

activity and no bent for foreign affairs, so that it was a surprise when he was chosen Under-Secretary for Foreign Affairs in 1892. During the ten years in opposition, the Liberals began to look upon Grey as one of their leaders, and in 1905 he was made Foreign Secretary. In that office he remained for eleven years.

It fell to Grey to conduct the last negotiations with Germany, and those with France, in July and August, 1914, and to explain the British position to the House of Commons and the country. He strove hard for peace, and his case at the moment was so convincing that he had no difficulty in committing Britain to the struggle with the full assent of the people. He remained in office, quietly discharging his duties, during the earlier part of the War, and also after the Coalition Government was formed, but in December, 1916, he resigned with Asquith. Already a K.G. he was created a viscount, July 6th, 1916, after refusing an earldom. He died at Fallodon, September 7, 1933. His little volume "Fly-fishing" (1899), a standard work on its subject, was followed in later life (1927) by his delicately written "Charm of Birds." Grey was always a lover of birds, and this work expressed his gratitude for their music.

Grey, Lady Jane (1537–1554) Very sad is the story of this sweet and innocent child, the "nine days' queen" of England, who was sacrificed to the self-seeking ambition of shameless intriguers. Daughter of Henry Grey, Duke



GREY SPEAKING IN THE HOUSE OF COMMONS

Viscount Grey of Fallodon before his elevation to the peerage was Foreign Secretary from 1905 to 1916, and during that time made two of the most momentous speeches heard in the House of Commons in modern times—one in 1910 on the Agadir crisis, and the other in 1914 announcing the British ultimatum to Germany on the eve of the World War. This drawing shows Grey speaking in the House of Commons at the time of the Agadir crisis, when there was serious danger of war between France and Germany, it was largely due to the firm tone of his speech that it was then averted.



LADY JANE GREY REFUSES THE CROWN

When Edward VI died on July 6, 1553, Lady Jane Grey was at Sion House, Brentford, the residence of her husband's father, the Duke of Northumberland. When she was informed that she was Edward's successor she at first refused to accept the crown, but her reluctance was at length overcome. This painting by Charles Leslie, R.A., shows the messengers making the announcement of her accession and her husband, Lord Guilford Dudley, and his mother trying to persuade her to accept the crown.

of Suffolk, great granddaughter of Henry VII and cousin of Edward VI, she was remarkable for her beauty and accomplishments. Under her tutor, John Aylmer, afterwards Bishop of London, she acquired great proficiency in Greek, Latin, Italian, French and Hebrew, and her learning aroused the admiration of the great scholars of the day. In pursuance of a plan to alter the royal succession from the Tudor to the Dudley family, the unscrupulous Duke of Northumberland caused her to be married to his son, Guilford Dudley. Edward VI was persuaded to settle the crown in her favour, and after his death, on July 6, 1553, Lady Jane was proclaimed Queen on the 10th. By the 19th the scheme had collapsed. Northumberland was arrested, and she a prisoner.

Lady Jane was never to be free again. She remained locked in the gloomy Tower of London for many months. Then an uprising against Queen Mary, in which Lady Jane's father took part, led the Queen to seal Lady Jane's death warrant. She was beheaded at the Tower on February 12, 1554. In her last speech she "washed her hands" of any desire to be queen, and said "I die a true Christian woman."

Grieg, EDVARD HAGERUP (Pron grĕg) (1843-1907). The leaping rhythms and strange harmonies of Scandinavian folk music were the

granted him a life pension. Thus relieved from the necessity of teaching, he devoted himself entirely to composition, with occasional concert tours. As a conductor he was magnetic, and everywhere he was acclaimed as a most individual and enchanting pianist. He played only his own compositions—beautiful lyrics, tone poems for the piano, that breathe all the exhilarating freshness of the Northland. Of his orchestral works the frequently heard "Peer Gynt" suites are most popular. His songs have a distinctive haunting quality, and great depth of feeling.

Grimm, JAKOB LUDWIG KARL (1785-1863) and **WILHELM KARL** (1768-1859). One of the most delightful books for children of all ages is "Grimms' Fairy Tales," compiled by two

inspiration that brought Grieg to a position among the great composers of the 19th century. He was born in Bergen, but was sent to Leipzig for his musical education, and his early compositions give evidence of this German influence. But on his return to Norway his imagination was captured by the entrancing Norwegian folk-songs, and he determined to develop the full beauty of these artless tunes by making them the basis of compositions for piano and orchestra. Thus he did for Norway what Chopin, in even greater degree, did for Poland, and Liszt for Hungary.

When Grieg was 31 years old the Norwegian government



EDVARD GRIEG

The music of Edvard Grieg won world-wide appreciation for, though he was not among the greatest of composers, his music had charm and originality.

brothers famed for their study of the German language Jakob's most important works were his "German Grammar" (1819) and "History of the German Language" (1848), which revolutionized the study of Teutonic philology In his monumental "German Mythology" (1835) he covered the whole range of his vast subject Grimm's Law—the regular sound-shifting or interchange of consonants between (1) Sanskrit, Greek, and Latin, (2) Low German, and (3) High German—was named after Jakob The brothers began a German dictionary and edited many old German classics Wilhelm's chief independent work was "German Heroic Saga" (1829) Otherwise his life was the counterpart of Jakob's

Seldom have two brothers lived in such close communion

In their school and student days they occupied the same room, and even after Wilhelm's marriage they always lived under the same roof, sharing to the full each other's books and possessions



A Brook

THIS GROUSE IS TRYING TO 'FREEZE'

When they wish to avoid being seen, and are surprised by an enemy close at hand many birds lie absolutely still, or "freeze," as we say, trusting to their resemblance to their surroundings for safety Here is a red grouse behaving in this manner This is the only purely British bird, for the species which inhabits our moors is found in a native state nowhere else in the world

Grouse. The British red grouse, *Lagopus scoticus*, has the distinction of being the only purely British bird, for it is found native nowhere but in our islands It is well protected all over the grouse moors of Wales, northern England and Scotland, and every year just before August 12, the opening day of the grouse season, there is a tremendous exodus of sportsmen from London and the south, so important is this event In shooting grouse, the birds are usually "driven" by a line of beaters towards the row of "butts," semi-circular walls of turf, behind which are the shooters On either side of the row of butts are men known as "stops," whose duty it is to prevent the grouse from flying out at the sides There are usually several rows of butts, the party moving from one to another To shoot over a big moor is a very long day's work

Besides the red grouse, which is actually a rich red-brown, with a scarlet wattle over the eye, we have the fine black grouse, or blackcock, from whose tail comes the familiar curly "blackcock's feather" This handsome blue-black and white bird has a sombre mate, aptly described by her name, grey hen The blackcock goes further south than the grouse, being found in Somerset, and in South Wales, but innumerable attempts to acclimatize the other bird on the apparently suitable Exmoor and Dartmoor country have always failed Further north still, and especially on the higher mountains, you find a smaller bird, the ptarmigan, a



A STORY BY THE GRIMMS

In the Grimms' tale of Cherry, or the Frog-Bride, the king's youngest son is helped in all his tasks by an ugly frog, who is really the fairest maiden in the land under a spell Here he is watching the frog go by in her pumpkin-coach, a moment later she is changed back into a lovely girl.

From a drawing by G. Cruikshank



H. B. Herring

PTARMIGAN IN WINTER

Many creatures of the north turn quite white in winter, benefiting by their resemblance to the snow-clad hills or mountains on which they live. Among these is the ptarmigan, a species of grouse, whose normally brown plumage is moulted for the white dress you see above. This bird is found on the Scottish mountains.

type of grouse which turns white in winter. Close relatives of the grouse family are the capercaillie, the pheasants, and the partridges. All these birds are members of the same order as our familiar domestic fowls.

Of the North American species the best known is the ruffed grouse (*Bonasa umbellus*). It is about 18 inches long and has tufts of shiny black feathers on each side of its neck.

Guadeloupe. In the French West Indies, about 75 miles north of Martinique, lie the twin islands of Guadeloupe, which, with five near-by islets, constitute the largest colony of the French in this region (area, 688 sq. miles). A narrow strait divides the two main islands, one of which is crowned by lofty mountains, while the other is a low plain. The products are chiefly sugar, coffee, vanilla, cocoa, bananas and rum. Terrible damage is often done here by earthquakes and by the terrific hurricanes which sweep the Caribbean Sea. The capital is Basse Terre (7,700 inhabitants) but Point-à-Pitre (30,000 inhabitants) is the largest town and chief harbour.

Guadeloupe was discovered by Columbus in 1493. Except for short intervals, when it was held by England and Sweden, it has been French since 1634. It is administered by a governor and general council, and is represented

in the French Parliament by a senator and two deputies. Its population is about 267,000, chiefly negroes and mulattoes.

Guatemala. (Pron gwah-tem-ah'-la) Nature has bestowed her gifts with so open a hand upon the republic of Guatemala, the most populous and by far the most important state of Central America, lying just south of Mexico, that the natives are wont to refer to it as "Paraiso," or "Paradise." With an area of 42,500 square miles, Guatemala, for the most part mountainous, includes a remarkable variety of scenery and climates.

You may travel from coast to coast on the inter-oceanic railway. Starting at sea-level in the early morning from Puerto Barrios on the Atlantic coast, you pass through richly foliaged banana lands, with the little towns that have sprung up to house the workers, and then through many miles of uncultivated country with an endless variety of tropical vegetation. Here and there you may see the quetzal, the national bird of Guatemala, with its brilliant and sparkling feathers, and millions of other birds of gay plumage. The quetzal also appears



Percy F. Martin

A RUIN OF ANCIENT GUATEMALA

The capital of Guatemala has been three times moved and three times devastated by earthquake. The second city, of which a relic is seen here, was ruined in 1773, but its inhabitants refused to leave, and their descendants still live there. Its modern name is Antigua Guatemala.

GUATEMALA

in the design of Guatemalan postage stamps As you gradually ascend by a series of plateaux and terraced slopes the climate becomes more agreeable and invigorating In the great interior tableland, 5,000 feet or more above sea-level, perpetual spring prevails, with rains from April to October

After crossing the lofty mountain backbone (10,000 to 12,000 feet), which runs within 50 miles of the Pacific coast, you arrive at Guatemala City (population, 121,000), the thrice destroyed capital of the republic After the terrible earthquakes and volcanic eruptions of 1541 and 1773, the people built the present city on a site which seemed safe from earthquakes, since the great cathedral there, erected by the Spaniards in 1620, had stood for 150 years

Here for a century and a half "New Guatemala" thrived until the dreadful convulsion of 1917, when even the great church was shattered, and the little bright-coloured houses that used to glisten in the brilliant sunlight, together with the larger dwellings, were all destroyed Its citizens at once set about rebuilding upon the same site, not wishing to abandon a railway and commercial centre so favourably placed on the divide between Atlantic and Pacific

From the capital you entain for San José, the Pacific port, and get a glimpse of the richest and most densely settled lands of the republic Although Guatemala is rich in gold, silver, lead, and other minerals and has immense forests of valuable timber (the Indian name Guatemala is said to mean "Land of Forest"),

GUIANA

its chief industry is agriculture Abundant rainfall and the fertile volcanic soil make possible two crops of wheat a year, three crops of maize, and rich yields of sugar-cane and coffee About 100,000,000 pounds of coffee are exported annually Among other valuable exports are bananas and chicle (for chewing gum)

Guatemala succumbed to the revolutionary fever that spread over Latin America in 1930-31 Street fighting in the capital was violent but brief, four presidents held office in three weeks

Of the population of about 3,000,000, some 60 per cent are Indians A large majority of the remainder are "Landinos," or half-castes, and a smaller number are pure whites (See Central America)

Guelfs (Pron gwelfs) AND **Ghibellines** (Pron gib'e-lēnz) These were two great political parties whose rivalries long distracted Germany and Italy "Welf" (which became "Guelf" in Italian) was the name of a German ducal family that ruled Bavaria and Saxony in the Middle Ages, its most noted member being Henry the Lion (1129-1195) who was deprived of his duchies by the Hohenstaufen emperor Frederick I (Barbarossa) The rival battle-cries of these two families—"Hi, Welfen!" and "Hi, Waiblingen!" (the latter from a little village in Swabia, near Castle Hohenstaufen)—were corrupted in Italy into "Guelf" and "Ghibelline" respectively

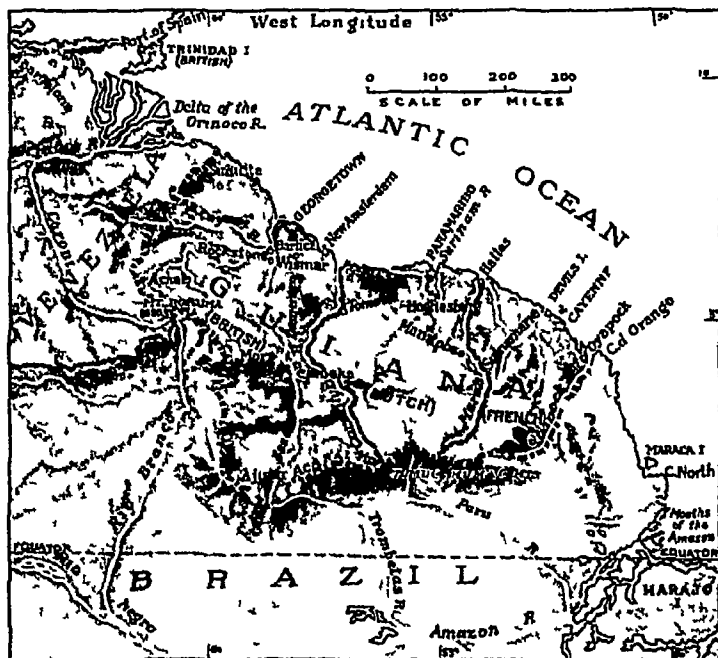
The Hohenstaufens stood for a strong monarchical government and for the imperial rule over Italy, while the Welfs represented feudal

opposition to the monarchy, and the independence of the Italian towns The influence of the Papacy was usually on the side of the Welfs After the fall of the Hohenstaufen emperors (1254), the larger issues between the two parties were lost sight of in petty feuds

The names Guelf and Ghibelline lingered on in Italy By the 15th century they came to mean little more than differences in the wearing of feathers in the cap, in cutting fruit at table, in gestures in speaking, etc

The House of Welf (Guelf) continued to rule certain parts of Germany—Hanover and Brunswick—until late in the 19th century With George I, in 1714, the Guelf (or Guelph) family came to the throne of Great Britain

Guiana. (Pron gē-ah'-na) Geographers give the name of Guiana to that little-known part of South America between the river Orinoco, the river Amazon and its tributary the Rio Negro, and the Atlantic



THE THREE GUIANAS

This contour map shows the three territories of the British, French and Dutch Guianas They are abundantly watered by rivers, and the alluvial coast plain, which was at one time under the sea, is now drained and dyked, making rich, productive land

GUIANA



sometimes grow in large masses with flower stems 12 feet high, and gigantic vines festoon the trees. In the lagoons and rivers grow many kinds of water-lilies, the largest, the famous *Victoria regia*, with leaves 5 or 6 feet across, was brought from British Guiana and distributed over the civilized world. Alligators and great fish of innumerable species abound in the rivers, and the forests

Ocean. In common usage, however, Guiana means especially the three colonies of British Guiana, Dutch Guiana, and French Guiana.

The coast is everywhere low, being nowhere much above sea-level. For 20 miles inland the land was once a mangrove swamp, but it was dyked and drained by the early settlers, and thus made into fertile plantations. Along the shores and on the banks of the numerous rivers,



CITY AND RIVER IN GUIANA

Perhaps there is still a suggestion of its Dutch origin in Georgetown, the capital of the British colony of Guiana, but, as may be seen from the top photo, there are such modern conveniences as petrol-pumps and taxis. Below is an upper reach of the Surinam, which is the principal river of Dutch Guiana.

Photos: Dorien Leigh A. F. L. Guise

where similar plantations have been formed, live the scanty population. Beyond the stretches of rich, heavy loam brought down by the rivers lie low ridges of sand and shells, showing where the coast line was in former ages. Farther inland the country rises into a rocky, hilly plateau (3,000 to 4,000 feet above sea level), covered with almost impenetrable forests, except where grassy plains or savannas occur. The ranges of low mountains and hills which traverse this plateau are rich in gold, aluminum ore, and other minerals.

In the perpetual summer of the hot, moist climate vegetation flourishes. The district is noted for the height and variety of its trees, many of them furnishing valuable woods, and for the size of the leaves and flowers. Orchids

are filled with richly-plumaged birds, such as the scarlet ibis, white egret, and flamingo, reptiles, and such other animals as the tapir, sloth, ant eater, jaguar, and monkey. The insects are remarkable for number and brilliance.

The Guiana coast was first sighted on the third voyage of Columbus in 1498. During the 16th century many Spanish and Portuguese adventurers made unsuccessful visits to its rivers in search of the fabled El Dorado. Sir Walter Raleigh led several expeditions, and was beheaded soon after his last disastrous voyage. By the middle of the 17th century several British, Dutch, and French settlements had been founded. The colony of Surinam, now known as Dutch Guiana, was given up in 1667 by the British to the Dutch in return for New York.

British Guiana, as its boundaries stand after decades of wrangling with Venezuela, contains about 89,500 square miles, and has a population of about 323,000. It is the only British possession in South America apart from the Leeward and Windward Islands, which lie north-west of Venezuela. More than two-thirds of the people are negroes and Hindu coolies brought from India as labourers, there are also about 7,500 aborigines. The Europeans are mainly Portuguese and British. Sugar, rice, coconuts, coffee, rubber and bauxite (aluminium ore) are the chief exports. Gold worth about £175,000 annually is mined. There are only about 100 miles of railway, and transportation is carried on chiefly by water. The capital, Georgetown, which has a population of some 63,000, is below high water mark, and used to be constantly drained by canals and steam pumps. It is protected from the sea by a stone wall a mile long, and the older houses are built on piles. The governor of the colony holds his office by appointment from the Government.

Dutch Guiana, sometimes called by its old name Surinam, is about 50,000 square miles in area, with a population of about 150,000, chiefly Hindu coolies, Chinese, Javanese, negroes, and other labourers. The most interesting people are the "bush negroes," descendants of runaway slaves who escaped to the forests and gave the Government so much trouble in the latter half of the 18th century that it had to make treaties with them and grant them subsidies. Before missionaries had worked among them they had relapsed into a curious heathenism blended with survivals of Christianity. Cacao, coffee, sugar, rice, maize, bananas, and gold are the chief products, but the revenues of the colony fall below its expenses and have to be supplemented by grants from the Netherlands Government. A third of the population live in Paramaribo, the capital, which has a population of 47,000.

French Guiana is the smallest of the three colonies, with an area of about 32,000 square miles and a population in the neighbourhood of 50,000. It has always had a bad name from the terrible disasters which attended early attempts at settlement. In 1763 a colony of 12,000 came from Alsace and Lorraine, and was reduced, after two years of hunger and disease, to a fever-stricken band of less than 1,000. During the French Revolution it was made a convict settle-

ment, and is still used for that purpose. Devil's Island, near its coast, is famous as the place where Captain Alfred Dreyfus (*qv*) was imprisoned. It was decided in 1936 by the French Government to send out no more convicts to this notorious island. There is little industry, and the imports exceed the exports. The capital of French Guiana is Cayenne (population about 14,000), which gave its name to the well-known red pepper.

Guilds. During the Middle Ages the men of each trade in every important town of Europe were organized into associations known as craft guilds (often spelled "gilds") for the purpose of regulating their occupations and preserving a monopoly. The weavers seem to have been the first to organize, but later the goldsmiths, saddlers, fishmongers,

bakers, dyers, glovemakers, and many other occupations, some with only a handful of workers, formed separate guilds. In the larger cities, like Paris and London, there were in the 14th century as many as 50 or more different guilds. Usually they were authorized by the local governments, but sometimes they obtained a charter from the king. The Guilds or Livery Companies of the City of London remain today as an interesting reminder of these medieval days (*See Livery Companies*). The rules of the guild provided that no one who was not a member should practise the trade within the town.

The guild regulations required that all articles made and sold by their members should be of a



A CRAFT GUILD EXAMINATION

The medieval guilds, to which every craftsman was supposed to belong, consisted of masters, journeymen and apprentices. Before a man could become a master and employ workmen he had to prove his efficiency to the wardens of his guild. In this illustration from a MS in the British Museum a mason and a carpenter are being examined.

certain quality There had to be, for instance, according to the rules of the weavers' guild, a certain number of threads to the inch in standard cloths The hours of labour were also regulated In later times insistence on outworn standards and processes became a handicap in industry, and led to a shifting of manufactures to villages and new towns where guilds were not established

Other guild regulations provided for mutual assistance, the care of sick and needy members, and of members' widows and orphans Once a year—sometimes oftener—the members gathered for a feast (the word "guild" means "feast" or "payment"), and in summer, usually on Corpus Christi Day, they often gave one of the miracle plays popular at the time (*See Miracle Plays*)

Since the members of a craft usually lived in the same street, the craft guild was a natural centre for the common interests of those who belonged to it

Membership of a guild was ordinarily obtained by passing through an apprenticeship The young craftsman was bound out by his parents to an employer for a number of years—usually seven—during which time he was fed and clothed and lodged with the master's family, above or behind the shop When his apprenticeship was finished he became a "journeyman"—that is, one who was employed by another person to work at a day's wages (*French, journée*)—and served for wages and worked for whomsoever he pleased If he were ambitious and saved enough of his wages to start a small shop of his own, he might possibly become a master with journeymen and apprentices under him, and could then take part in all of the meetings of his craft and hold office

In addition to the craft guilds, there were older and more powerful organizations called "merchant guilds," composed of men who made a business of buying and selling, and engaged in what we should call wholesale trading to distant places It was



GUILD HOUSES AT ANTWERP

The ordinary "guild" of the Middle Ages was the equivalent of the modern "trade union", but there were larger and more powerful guilds—of merchants—corresponding more to modern "cartels" and "trusts" The latter had headquarters in fine buildings, usually in the centre of great cities, above, for instance, are the 16th- and 17th-century guild halls or houses of Antwerp in the Grand' Place.

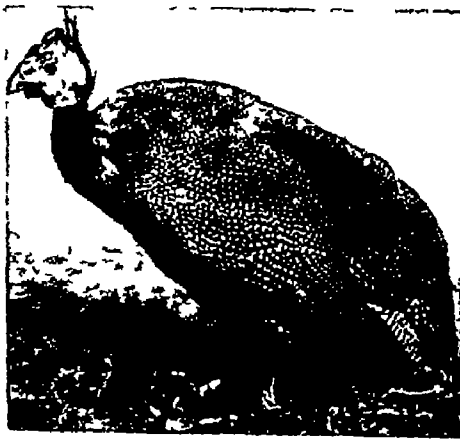
members of such organizations who formed the great Hanseatic League that was such a power in the Baltic lands, and even had quarters in the Steelyard of London On the Continent the merchant guilds had a great influence in the city government, and the guild hall of the merchants is today one of the striking buildings in many European cities Many non industrial guilds existed, these were in most cases founded for charitable and religious purposes

Guinea-fowl. (Pron *gm'-i*.) You will probably know this bird as well by its voice as by its thick, beautiful, greyish plumage marked with small white spots The continual calling

of these birds at the slightest alarm is one of their outstanding characteristics, and they are often unpleasantly noisy if kept near the house Their brown flesh with its "gamy" flavour is becoming increasingly popular

They came originally from Africa, and were common from the Guinea coast southward to the Cape of Good Hope They are also found in the northern part of that continent, where they have been domesticated since the days of the Romans

Guinea-pig. In spite of its name, this restless, little animal is not a pig, and



THE NOISY GUINEA-FOWL

The chief thing about this bird is its noise, which you cannot help hearing if there are any guinea-fowl in your neighbourhood. Thus a guinea-fowl makes an excellent "watch-dog" for poultry



C. Reid

TWELVE HEALTHY GUINEA-PIGS AT HOME

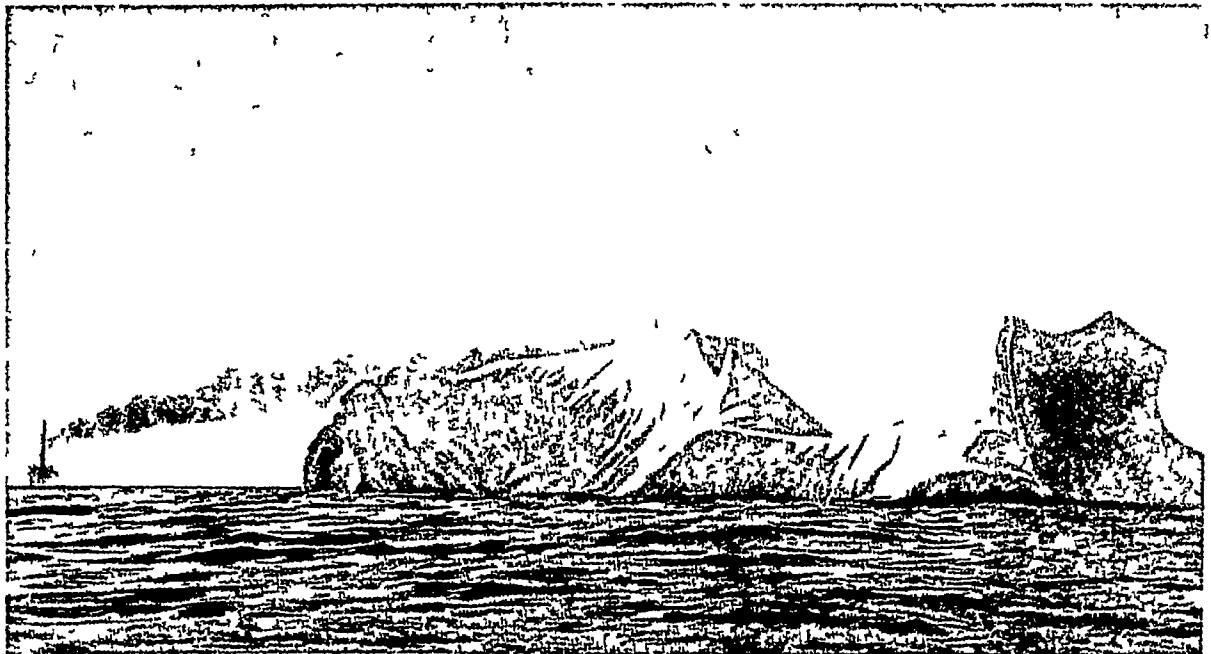
The guinea-pig is an animal that is singularly free from disease provided it is housed correctly and fed properly. These specimens are typical examples from a well-nurtured stock. Such a "hutch" as this, built specially for these little creatures, is sometimes called a "caviary," "cavy" being an alternative name for guinea-pig.

not a native of Guinea, but of Guiana, Bolivia, Brazil, and some other parts of South America. Its real name is the *cavy*, and it is a rodent, related to the hares and rabbits. It was domesticated in Europe in the 16th century, and is still popular. The cavy is about 6 inches long, and exists in several varieties, some of which have short hair and others long, curiously ruffled hair. The colours are varied, usually black and white, tan and white, or a mixture of all three. Guinea-pigs are gentle and make amusing pets. They live on vegetable food.

In recent years the guinea pig has assumed a new importance by becoming almost indispensable in the biological and pharmacological laboratories of the world for the standardization of medicines, serums, and vaccines.

evaporated, the remaining salt would require many times more than all the ships of the world to carry it. This great ocean river, several degrees warmer than the surrounding ocean, is 50 miles wide at its narrowest point, and its depth is about 2,000 feet. It flows at a velocity ranging from two to six miles an hour.

The stream receives its name from the Gulf of Mexico, where it originates. Driven by persistent ocean winds, aided by the rotation of the earth, it rounds the Florida shore, and then runs close along the coast of North America, separated from it by the icy waters of the Labrador Current (here known as the "cold wall"). Off Cape Hatteras it curves to the east, under the influence of the increasing westerly winds and the rotation



WHAT THE GULF STREAM SAVES US FROM

For their latitude the British Isles should have winter temperatures as low as those of Canada and Russia, but we are saved from such conditions by the Gulf Stream, which flows from the Gulf of Mexico to our western and northern shores. The iceberg seen in the photograph has had its sides rounded and smoothed by the warm waters of the Gulf Stream. Were it not for this warm current of water we should have icebergs in the English Channel.

Courtesy of U.S. Coast Guard

of the earth. Fan-like, it spreads as it journeys, growing gradually wider, shallower, and cooler, until it merges in the general drift of warm water flowing north eastwards from the South Atlantic Ocean to Europe. As this Gulf Stream drift approaches the eastern Atlantic it splits into two parts, one going south along the coast of Africa, and another turning north and dividing into three smaller currents which warm the seas washing the British Isles, Scandinavia, and parts of Iceland. That is one reason why London and Paris, although no farther south than parts of ice bound Labrador and Canada, enjoy a fairly mild climate, and why Norway and Iceland are habitable despite their high latitudes.

Our Debt to the Gulf Stream

Although scientists today consider the Gulf Stream a less important factor in the climate of Europe than they used to think it, there seems little room for doubt that it is an active agent in warming the south westerly ocean winds which give the western coast of Europe so much milder a climate than the corresponding latitudes on the east coast of America. The Gulf Stream serves another important purpose in keeping the harbours of north western Europe free from ice.

The waters of the Gulf Stream are a deep blue, strongly contrasting with the lighter blue of seas it passes through, and they carry along great quantities of seaweed, detached from the coral islands round Florida, and the island of Cuba. The temperature of the Gulf Stream in summer as it issues from the Gulf of Mexico is about 84° F, and by the time it has reached mid-Atlantic it has decreased only by about 14°.

Gulls AND TERNS

Most familiar of all the creatures of the seaside are the gulls, and in many parts of our shores their consins, the terns, or sea swallows, are found. They are all excellent fliers, the gull's wings being very long and powerful, which enables it to make steady headway against the strongest gales. It has webbed feet, so that it is equally at home in the water.

Gulls are great travellers, though the record for long distance travelling does not belong to the gull, but to the Arctic tern.

Thus bird regularly makes a round trip of about 22,000 miles between its winter and summer homes, for it nests very far north, and as soon as the young are grown the whole family takes wing for the Antarctic continent.

Gulls and terns are the most widely distributed group of birds, for there are about 50 species of each that are scattered throughout the world. Together they comprise the family of *Laridae*. The gulls range in size from that of a pigeon to that of a goose, and terns are smaller, with more slender bodies and comparatively much longer wings and tail. All these birds are very sociable and nest in colonies of thousands and sometimes millions. But such destruction has been carried on in some of their breeding colonies, for the sake of their edible eggs, and so many of the adult birds have been slain for their plumage, that gulls have disappeared from many districts.

The increasing use of oil fuel at sea is an important contributory factor in the destruction



BLACK-HEADED GULLS AT THEIR NESTS

A Brook.

These black headed gulls, which are the sort one sees so much of in London during the winter, live almost as much inland as at sea, and during the breeding season especially come in to the "gulleries, or gull ponds. There they make big nests of reeds and grass, and for months there are just such scenes as that illustrated here.

of sea birds like the gull and tern. Ships discharge oil waste, which floats on the surface of the water and this clogs the wings and feathers of birds that alight there. Unable to rise again, the unlucky birds exhaust themselves by useless struggling and, unable to obtain food, succumb in large numbers round the British Isles.

The prevailing colour of most adult gulls and terns is white below and pearl-grey above, but the black-headed, and greater and lesser black-backed gulls, have the plumage implied by their names, while many others have black tips to the wing and tail feathers. Terns, too, usually have a black-capped head, and one species is more black than white. A few species are dull grey all over, while young birds are brownish for a year or more. The feet and bill are usually bright yellow or red.

All gulls and terns are fond of fish, and greedily eat dead ones as well as any food refuse found floating on the water, thus harbour and shore gulls are valuable scavengers. Inland gulls are valuable friends to the farmer, because they eat field-mice and the insect pests which do such harm to crops and trees. Among the commonest of the birds are the black-headed gull, which haunts flat and marshy coastal districts, the herring gull, a large and handsome bird, the lesser black-backed gull, and the greater black-backed gull, and the so-called common gull.

It is easy to tell terns from gulls, if you look closely at them. They are more graceful in flight, as their nickname "sea-swallows" indicates. Gulls usually have square tails, while most terns' tails are forked. In terns the beak is more slender and often seems longer, and their feeding habits also differ from those of gulls, for gulls often alight on the water to feed, while terns hover and plunge for their food. Another distinction is that gulls usually fly with their bills on a line with the body, while terns carry theirs pointed downward.

The common tern is found in all parts of the Northern Hemisphere, as well as in South America and Africa. It often hovers over schools of fish, and fishermen find it of great service in locating fish. Other British species are the Sandwich, roseate, and little tern, occasionally, the Arctic and black terns are seen on our coasts. Terns, which nest usually on sandy shores rather than on the sea cliffs, defend their nests very vigorously, flying at intruders and attacking them.

Gums. Gums may be called a by-product of the plant kingdom, for they are the juice or sap exuded from certain trees or shrubs. There are about 150 varieties known to commerce, most of which are used in varnishes, confectionery, drugs, and industrial preparations.

In popular usage the word gum is applied to true resins and to gum resins, or mixtures of

gum and resin, as well as to gums proper (See Resins).

Gum arabic is one of the most useful of the gums. It is brought into the market in the form of roundish "tears," which vary in colour from garnet red to light straw, and are always more or less transparent. The lightest-coloured varieties are the best. It is employed in the manufacture of confectionery, such as marshmallows and "Turkish delight," and used in



FELLING A GIANT KAURI GUM

The gum trees of Australia and New Zealand are famous for their tremendous size, and here is a fine specimen of a Kauri pine being felled in New Zealand. You have only to compare its thickness with the men at work on it, to realize what a giant this is, yet there are many far larger trees in those lands.

New Zealand Govt.

pharmacy for soothing and softening lotions and as a suspensory agent in emulsions. It is also used in making mucilage and adhesive paste, to give lustre to crêpe and silk, and to stiffen other fabrics. It comes from varieties of acacia in Turkey, Australia and northern Africa.

Gum tragacanth, which comes from Asia Minor, will take up as much as 50 times its weight of water, and by doing so makes a thick mucilage, having many valuable uses. It is employed as a thickener for colours and mordants in calico-printing, in medicine as a means of binding insoluble powders, and in the

GULLS AND TERNS ON CLIFF AND BEACH



1, Mrs Black-headed Gull is returning to her nest on the shores of an estuary 2 Baby Black-head has been caught crawling out of his nest and is getting a good scolding 3, The Great Black-backed Gull seems to be posing for his picture, standing on a heap of earth 4, The Herring Gull is looking around for a bite to eat. 5 Mrs. Arctic Tern is snapped in the act of alighting at her nest. 6, Mrs. Roseate Tern is at home among the rocks.

mounting of all kinds of beetles and other insects in museums or private collections

Kauri gum is the resin of the kauri pine of New Zealand. Most of it is obtained in fossil form. It is used in making fine varnishes. The copal gums, which are also used in varnishes, are fossil resins from Zanzibar, Madagascar, and many places in the East.

Gunpowder. We do not know when gunpowder was invented. In fact, it cannot be said to have been invented by any one man, for it was a gradual development from various "fire" substances, long known in many countries before they were adapted to explosive or military use. The Chinese early had a knowledge of some such incendiary substance, and the "Greek fire," first used by the defenders of Constantinople against the Saracens in 673, is believed to have been somewhat similar to modern gunpowder. The English Franciscan friar, Roger Bacon (died about 1294), and the German monk, Berthold Schwartz (early 14th century), share the honour of having been the first to give a scientific account of the composition of gunpowder.

The gunpowder of early days was much the same as the common black powder of today. It consisted of a mixture of saltpetre (potassium nitrate or nitre), charcoal, and sulphur. This mixture is a purely mechanical one, there being no chemical association of the

ingredients. The proportions of these chemicals have varied greatly from time to time, a fair modern standard being 75 per cent saltpetre, 15 per cent charcoal, and 10 per cent sulphur. These ingredients are ground to a fine dust, thoroughly mixed into a moist paste, pressed into cakes, and dried. The cakes are then broken by rollers into grains of varying sizes, which are glazed by friction against each other in revolving barrels. Each operation in a gunpowder works is carried on in a separate shed, usually surrounded by water, so that the danger of widespread damage being caused by explosions is minimized.

Except for fireworks, blasting work and certain special military purposes, the old-style gunpowders have been almost entirely replaced by the smokeless powders and the high explosives. Smokeless powders were first perfected in 1884 and put to military use by the French, but they are now used everywhere. (See Dynamite, Explosives)

Gustavus Adolphus, KING OF SWEDEN (1594-1632) Gustavus Adolphus was born in Stockholm Castle, and was trained from childhood for his kingly duties. When he was only 9 years old he began to take part in public affairs, and in 1611, at the age of 17, he had mounted the throne as Gustavus II. So carefully had he been trained that before he was 20 years old he had won a war against Denmark,



GUSTAVUS ADOLPHUS BEFORE HIS LAST BATTLE

Gustavus Adolphus is praying for divine aid just before the Battle of Lutzen. His army scored a brilliant victory, but the great king was killed. Near the spot where he fell a granite boulder was placed on the day after the battle, and in 1832 a cast-iron canopy was built over it.

GUSTAVUS

and by 1630 he had extended his kingdom round the whole eastern shore of the Baltic by successful struggles with Russia and Poland

Gustavus Adolphus was led to enter the Thirty Years' War not only because he was an enthusiastic Protestant who hoped to relieve the misfortunes of the Protestant cause in Germany, but also because he dreamed of extending his kingdom even to German shores, so that the Baltic might indeed become 'a Swedish lake' France, under Cardinal Richelieu as Minister, gave him money for his expedition, to further French political aims

When Gustavus landed in the north of Germany, his army was not large, but it was well trained and disciplined. He was the greatest military genius of his age, being the first of modern commanders to supply his army from a fixed base instead of leaving it to live off the country by foraging and pillage. At first he was coldly received by the Protestant rulers of Brandenburg and Saxony, but they were brought to their senses after the awful destruction of Magdeburg by the imperialist forces and the foolish religious policy of the Emperor Ferdinand II. In the famous battle of Breitenfeld, near Leipzig (September 17, 1631), Gustavus overwhelmingly defeated the imperialist army.

Gustavus then pushed westward, through the "Priests' Lane" of rich bishoprics and monasteries of the river Main, to Mainz on the Rhine. In the spring he again took the field, and a second time defeated, and now mortally wounded, the aged Tilly in Bavaria. In this emergency the emperor took the humiliating step of recalling the imperialist general, Wallenstein.

One foggy day in November 1632, Gustavus succeeded in bringing Wallenstein to bay at Lützen, only a few miles from the site of his first great triumph. Again the Swedish troops gained the victory, but the battle was won at the cost of the life of their beloved king, for Gustavus fell wounded into the hands of the enemy, and was dispatched as he lay. (See also Thirty Years' War)



GUTTA PERCHA TREE

Here is a Malay, perched on supports stuck into the trunk, 'tapping' a gutta-percha tree. A more usual method of obtaining the "latex" is to fell the trees wholesale

Gutta-percha. (Pron gut'-a pêr' cha) In the rain-drenched Malay Peninsula and the neighbouring islands grow forests of huge gutta-percha trees (*Palagium oblongifolia*), members of the order *Sapotaceae*. Their spongy wood is useless, but between the wood and the bark is found a milky juice, or "latex," which, when it is boiled, produces a reddish grey substance like india-rubber.

This is the gutta-percha which made ocean cables possible, and which has many other important uses. It is a non-conductor of electricity, is unchanged by water, and can be very easily worked when it is made warm, while it retains its shape and becomes leathery and very tough, but pliant, when it cools.

Gutta percha is often confused with rubber, because both are the dried juice of trees, and resemble each other in many ways. Like rubber, gutta-percha is waterproof and can be "vulcanized" with sulphur, but it is not elastic, and, unlike rubber, it softens in warm water, so that it can be drawn into fine sheets or moulded into any form, retaining impressions to the finest detail when it becomes cool and hard. It is prized for making certain kinds of surgical instruments, is used

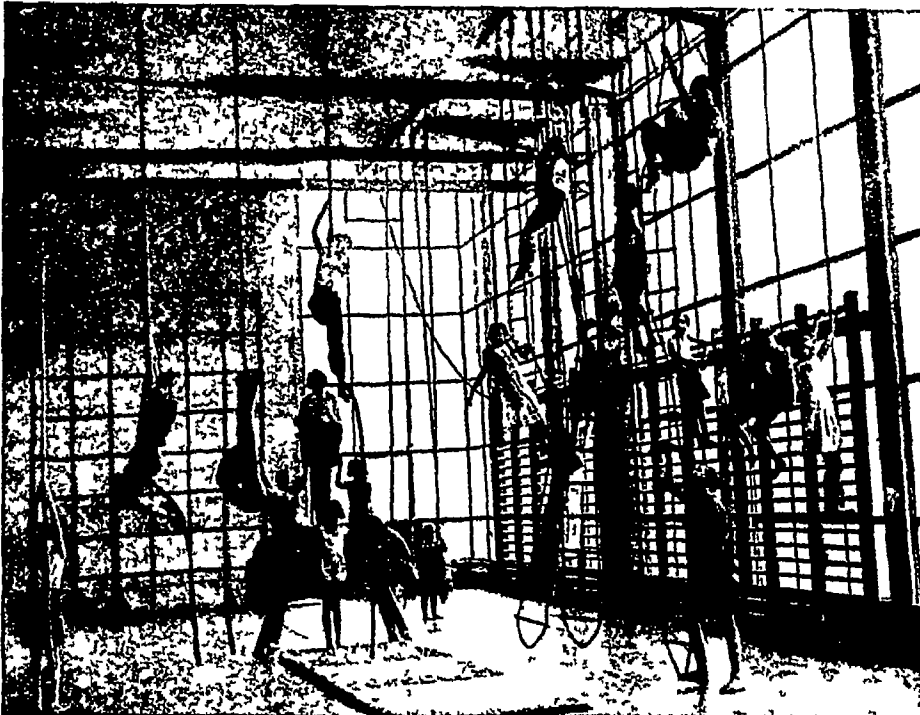
in the moulding of plates for false teeth, and has numerous other uses.

Gutta percha has been known in western countries only since the middle of the last century, but in China it has been used much longer. Sometimes the trees are tapped, but as the juice flows very slowly, it is more usual to cut down the trees to collect the "latex," a large tree yields only 2 or 3 lb. This wasteful practice has denuded some of the forests and in a few places plantations of gutta-percha forests have been started to replace the loss.

Gwalior, INDIA. The premier Mahratta state in Central India, Gwalior, is governed by a native prince of the highest rank. Known as the Maharajah Scindia, he is entitled to a salute of 21 guns, and rules over a country of some 26,000 sq. miles, with a total population of 3,500,000. Gwalior, the ancient capital, is the most historic town in the state,

it contains a famous hill-top fort Lashkar, the modern capital, is really an extension of Gwalior city, their combined population being 80,000 The state is fertile, watered by the rivers Chambal, Narbada, and Sind, and its agriculture is aided by big irrigation works

Gymnasium. Most schools have a "gym" where the students are taught physical development with the aid of different appliances devised to exercise the muscles of the limbs, trunk, torso, and neck on anatomical principles Among these may be mentioned the horse, the overhand ladder, climbing ropes, rings, and horizontal and parallel bars familiar to most



BUDDING GYMNASTS IN ACTION

These children are enjoying themselves—and at the same time improving their physical condition—in the "gym" attached to the Pioneer Health Centre at Peckham. The extensive equipment includes rope-ladders, wall-bars, climbing ropes, and the indispensable vaulting horse. It will be noted that each boy and girl is barefooted and most are dressed in informal sports kit. A qualified instructor will normally be present to "show them the ropes"

school children Besides there are dumb-bells, bar-bells and Indian clubs for strengthening the muscles and teaching rhythm of movement, and punch-balls to inculcate timing By these various means you can be taught to perform seemingly difficult gymnastic feats in an easy, confident style, without strain or distortion Coordinated movements and perfect timing are the secrets of good gymnasium work, without them you will never acquire the style and judgement that make a good gymnast In Germany the schools teaching classics and history are called *Gymnasien* The word gymnasium comes from Greek *gymnos*, "naked", Greek youths stripped when receiving their athletic training Exercises without apparatus are dealt with in the article Physical Training

Gypsum. This very abundant mineral is composed of calcium sulphate in combination with water Translucent varieties are known as "selenite," and very fine grades of the material, of white colour and special lustre, make the familiar "alabaster" When gypsum is heated, part of the water escapes and the mineral becomes a white powder known as "plaster of Paris," the name being due to the fact that gypsum was early used near Paris for the making of plaster or cement If moistened, this powder "sets," and plaster of Paris is therefore widely used for making sculptors' casts and surgical splints In setting, the

material increases a little in volume, which causes all the details to be reproduced exactly Plaster of Paris is also used sometimes as a fertilizer on the land, where it facilitates the decay of certain forms of alkali

For making plaster of Paris the gypsum is ground in mills and calcined in large kettles, which are usually about 6 feet deep and 8 feet in diameter Heat is applied from below, and revolving arms stir the gypsum

Other important uses for gypsum are as a filler in paper and in the manufacture of ornamented stucco work

Much gypsum is also used in polishing plate-glass Raw gypsum is used as a basis for paints, to which the pigments are added, and when treated in various ways it makes cement and other building materials

Gypsum occurs in Cheshire and other parts of England, and is also found largely in the United States, it is often associated with salt deposits, and occurs also in many of the sedimentary rocks Water that has run through gypsum strata is very hard, and is valuable in certain types of brewing The famous Burton ales, for example, are brewed from such water

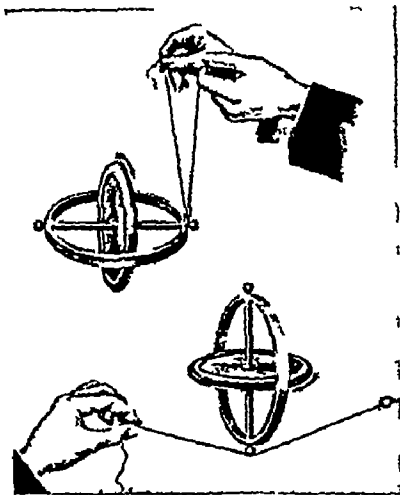
Gyroscope. (Pron jir-o-sköp) A spinning top, as you know, will remain upright as long as it keeps spinning Now imagine a wheel-shaped top, pivoted top and bottom inside a framework, and rotating rapidly It

GYROSCOPE

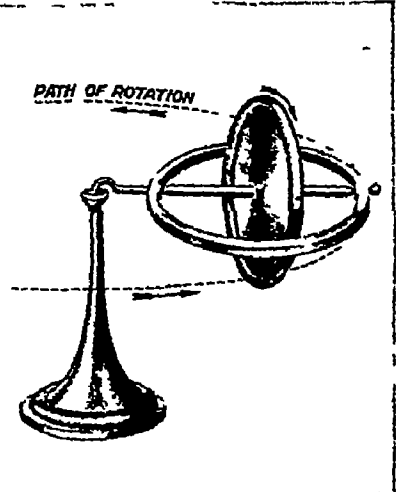
will give to that framework the same strong tendency to remain in its fixed plane that the top has when spinning alone. In other words, the axle of the rotating wheel cannot be turned quickly from its position except by the application of some strong external force. This is the principle on which the gyroscope works, whether it is the toy that everyone knows, or the elaborate apparatus that men of science have applied to important stabilizing purposes at sea, on land, and in the air.

The fundamental principle underlying the gyroscope is that, when a wheel or disk-shaped body is rotating rapidly about its axis, the body offers great resistance to any effort to change the direction of that axis. If you examine a toy gyroscope you see that it consists essentially of a heavy-rimmed wheel rotating on an axle mounted in a ring which itself does not revolve. When the wheel is rotated with sufficient speed the gyroscope performs surprising antics, such as running down a stretched thread without

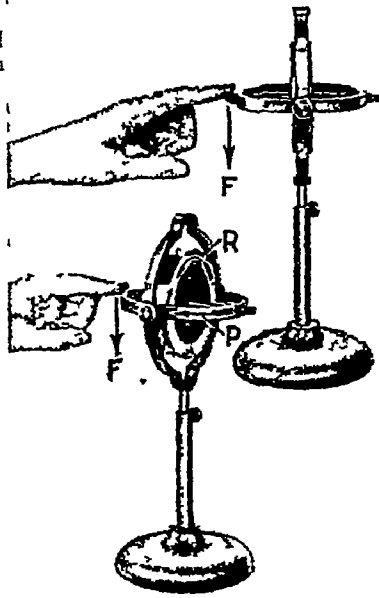
SOME OF THE QUEER ANTICS OF THE GYROSCOPE EXPLAINED



Here is demonstrated the gyroscope's tendency to "stay put" in the position in which it first starts spinning. At the left a toy gyro-top is standing out horizontally although only one end is supported by the string. A second top is securely "walking a tight-rope." Below we see what happens when we disturb the "rigidity in space" as it is called, of a small laboratory gyroscope. Instead of tipping when pressed down lightly, it turns around its vertical axis in the direction shown by the arrow P. This effort of the spinning wheel to get round so that its edge will be moving (arrow R) in the same direction as the finger pressure is called "precession." A case of continuous precession is shown at the right, where a spinning gyro-top whose free end is being subjected to the pull of gravity turns round its supporting stand, like a dog chasing its tail.



Most large modern ships are equipped with a gyro compass (perfected by the American, Elmer A. Sperry, about 1910), which is quite independent of the earth's magnetism, and is much more accurate than the magnetic compass. The gyroscope is used in the steering mechanism of the torpedo to keep it straight on its deadly journey under the waves. It may also be used to steady the ship's telescope, so that the navigator may make observations while the ship is rolling and pitching in a stormy sea, but even the rolling of a ship



may be checked by Sperry's application of the gyroscope in the form of a huge stabilizer in the ship's hold. On the other hand, it has been possible by gyro apparatus to produce artificial rolling for ice-breaking vessels used for keeping ports open in winter.

falling over, and spinning on the edge of a tumbler. You cannot knock it over without applying a comparatively strong force, for it resists you with a force many times its entire weight. This same principle explains why modern firearms are rifled to make the bullet or shell rotate so that the gyroscopic action thus imparted will keep the point of the projectile foremost as it whizzes through the air to its target.

When you do overcome the resistance, and tilt the gyroscope—and you may tilt it at almost any angle short of actually

toppling it over—you are astonished to find that not only does the wheel continue to spin at the new angle, but the whole apparatus turns in a circle about the spinning point, thus compounding two simultaneous rotations. This action has often been used to illustrate the various motions of the earth—its daily rotation about its axis, its annual revolution in its orbit, and a slow rotation, or "wobbling," of its axis, called the "precession."

The gyroscope was invented probably in the early 19th century, but by whom is uncertain. Its properties were studied by Foucault in 1852.

On land, the gyroscope makes possible the mono rail car, which remains upright even when rounding sharp curves on its track of a single rail. In the air the gyroscope has been successfully used as a stabilizer for aeroplanes, and it is due to this device that the "automatic pilot" is possible.

GYROSCOPE

Anschutz Kaempfe (d 1931) made the first practical gyro compass

The Brennan mono-rail, in which only a single rail is necessary, has been made possible, as above stated, by the application of the gyroscope

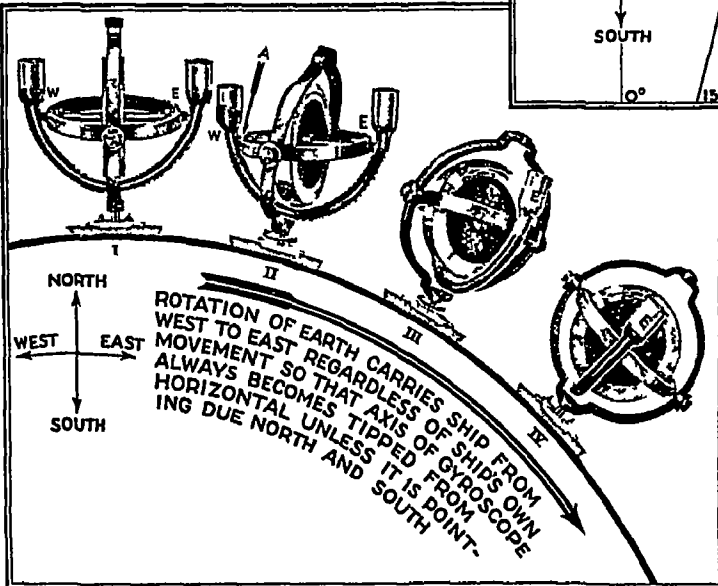
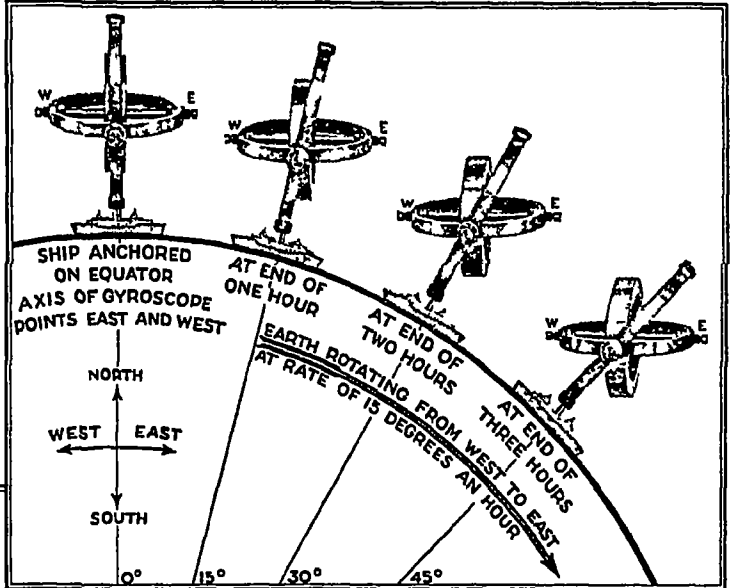
In 1907 Louis Brennan gave a demonstration before the Royal Society, and so successful was it that there seemed a wonderful future for his system. Little progress beyond the experi-

mental stage was made, however, although it is recognized that it has certain advantages over the normal system of railways

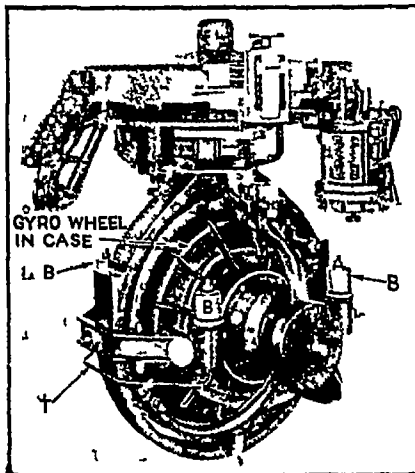
Experiments on the same lines as those adopted by Brennan were made by Richard Scherl, a native of Dresden, who gave a demonstration in Berlin in 1909. In the mono-rail designed by this inventor, the gyroscopes were governed by an automatic device

HOW A GYROSCOPE IS TURNED INTO A COMPASS

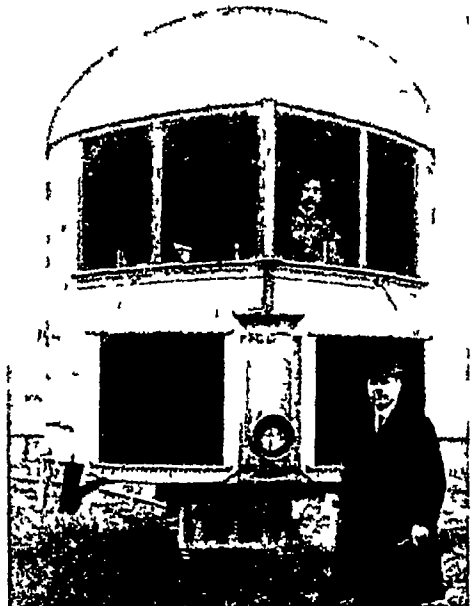
To understand the picture at the right imagine yourself suspended in space and looking at the earth from south of the Equator. A giant gyroscope aboard a ship is being carried around by the earth's rotation. The gyro-axis W-E points east and west. For the sake of simplicity in picturing angles, we have anchored the ship on the Equator, although, as the next picture shows, the ship's position or motion would make little difference. As the gyroscope is carried round, note that its "rigidity in space" holds the wheel parallel to its original position, so that the W end of the axis, still pointing west, dips more and more toward the earth. Now study the picture below. The original conditions are the same, except that a U-tube with enlarged ends, containing mercury, has been fastened to the axis supports of the wheel's frame. As soon as the west end of the axis starts to dip toward the earth, the mercury under the levelling force of gravity flows to that side of the tube. This results in a greater downward pressure on the



west end than on the east end of the axis. Precession, as illustrated with finger pressure on the previous page, sets in, and what was the west end of the axis turns toward the north. The turning continues until the mercury is balanced in the U-tube, a condition that can only exist when the axis of the gyro and the axis of the earth are in the same plane, or, in other words, when the axis of the gyro points in exactly a north-and-south direction. For purposes of illustration, the angles assumed by the gyro in the pictures have been greatly exaggerated.



In this Sperry compass, the gyro is part of an electric motor and is kept spinning about 6000 to 8000 times a minute inside its case. A pair of mercury containers B on each side correspond to the ends of the U-tube in the previous picture. The tube T connecting each pair is so small that the mercury will not flow rapidly back and forth as the ship rocks, but will respond only to prolonged tipping of the gyro-axis. When this happens, the gyro precesses, and the motion is communicated by its vertical supporting ring through electrical contacts to an auxiliary motor which keeps the compass card aligned properly with the gyro.



Louis Brennan beside his mono-rail car, in which a gyroscope keeps the car upright on one rail



HAVEN'T you often wondered why so many uneducated English people constantly drop their "h's"? You may be interested to learn that even the ancients dropped their "h's," and that the modern sound of the letter is a weakened form of the older and stronger Phoenician *Chelh*, which was pronounced like the Scotch or German *ch*. This Phoenician letter consisted of two uprights connected by two or three transverse bars *H H* and its name meant "fence." It was derived from the Egyptian hieroglyph representing a sieve *⊙*, which developed into the form *⊙*, and was finally transformed into the angular, ladderlike character. The early Greeks wrote it *Ϝ* and later, omitting the cross bars at top and bottom, gave it the form of our *H*. Its sound also ceased to be a harsh guttural and became an aspirate, or breathing sound like our *h*. Soon, however, the eastern Greeks lost the aspirate and, having no further use for the symbol with this value, adapted it to represent the long *e* sound (like our "a") calling it *Eta* instead of *Heta*, as formerly. The western Greeks retained the aspirate for a longer time, and the Romans took it over from them. But the Roman *h* was a very weak sound, and in vulgar Latin soon disappeared. This explains why the *h* sound is virtually non-existent in French, Italian, and Spanish, which are derived from the Latin. Perhaps one reason why the Englishman has so much trouble with his "h's," is that, during the period when the English language was taking shape, it was the rule to pronounce the letter in words derived from the Anglo Saxon, and to treat it as silent in words of Latin origin. This naturally caused great confusion. In a few English words of Latin origin, as *hair*, *hour*, *honour*, *h* is still, as in French, written, but not pronounced.

Habeas Corpus. (Pron *hā'-bi-as kor'-pus*) When a person is imprisoned or held anywhere against his will, a court of law may upon reasonable demand issue an order compelling the gaoler or other custodian to produce the person in court and show by what right he is held captive. If no lawful reason is found, the prisoner is released. This court order is called a writ of *habeas corpus*, often known as "the great writ of liberty."

Habeas corpus is a Latin phrase meaning "you must have the body." The principle is of ancient English origin, for in *Magna Carta* King John was forced to promise that "no free man shall be taken or imprisoned except by the lawful judgement of his peers and by the law of the land." Under this principle no one could be arrested and held in confinement on mere suspicion, without being formally accused of a crime.

This remained one of the mainstays of English liberty until Charles I set up the claim that a royal command was a sufficient answer to a writ of *habeas corpus*. This misguided policy, with similar arbitrary acts, cost the king his throne and his life. The result was that under Charles II the famous *Habeas Corpus Act* was passed, which extended the principle to mean that any person who was imprisoned for any crime except treason or felony, might demand and obtain his freedom under bail until called upon to stand his trial. Bail is the pledge or bond of some responsible person to pay a fixed sum of money if the accused person fails to appear for trial.

The amusing manner in which this law passed the

House of Lords is told by Bishop Gilbert Burnet. The lords who approved the bill had all filed out, as is customary when voting, and were returning to be counted as they entered the door. "Lords Gray and Norreys were named to be tellers," says Bishop Burnet. "Lord Norreys, being a man subject to vapors, was not all attentive, so, a very fat lord coming in, Lord Gray counted him for ten, as a jest at first, but seeing Lord Norreys had not observed it, he went on with this misreckoning of ten, so it was reported that they who were for the bill were the majority, though it indeed went to the other side."

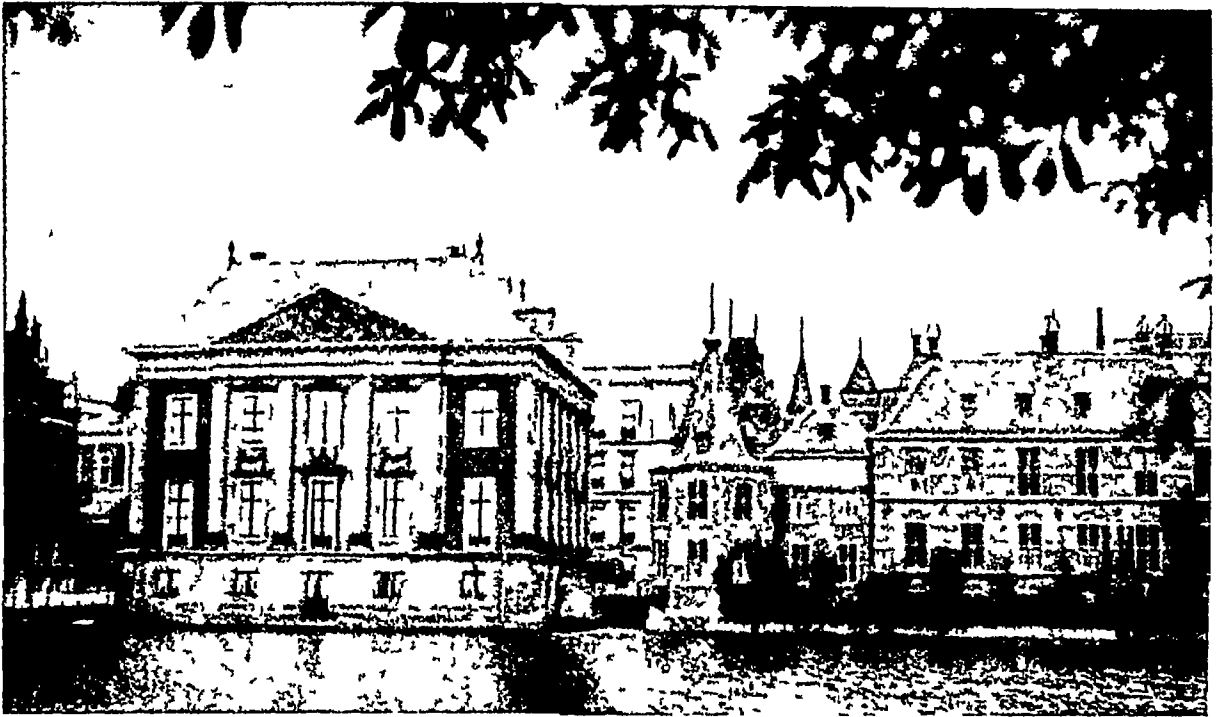
In times of national emergency the *Habeas Corpus Act* may be suspended.

Haddock. Next to the herring, the cod and the plaice, this is probably our best-known and most popular food fish. Its scientific name is *Gadus aeglefinus*, and it is a very near relative of the cod, from which it is distinguished by being proportionately deeper for its length, while behind the pectoral fins it has a



HADDOCK, RELATION OF THE COD

The haddock is one of the most important of all our food fishes. It is a member of the cod family, and you can distinguish it from the cod by the fact that in that fish the tail is rounded, not forked, and the first dorsal fin is also rounded instead of coming, as here, to a sharp point. Other differences are noted in the text.



Dorlen Leigh

THE HAGUE, WHERE HOLLAND'S GOVERNMENT HAS ITS SEAT

Just as Washington is the political capital of the United States and New York the commercial capital, so The Hague is the political capital and Amsterdam the commercial capital of Holland. The photograph shows the sheet of ornamental water near the centre of the city known as the Vyer. Across the water is the Bunnenhof, a square in which are the Parliament buildings, the most interesting of them being the Hall of the Knights in which joint sessions of the two chambers are held. Some of the Parliament buildings abut on the lake.

large black spot. In other respects it is a typical member of the cod family, feeding on shell-fish and crustaceans, and ranging in shoals through the North Atlantic and into the North Sea. This fish, unfortunately, seems to have suffered badly from the fisherman's net, and is now by no means so common as it was, say, in pre-War days. While large quantities of fresh haddock are regularly consumed, particularly in the fried fish trade, the most popular forms of this fish are the whole smoked or "finnan" haddock, renowned the world over, and the smaller, smoked fillets. A large export trade in these is conducted from the chief Scottish and English fishing ports. Haddock, which are usually found over a muddy or sandy bottom, are caught by trawling, or on lines baited usually with mussel. (See Fisheries)

A fish that must not be confused with the haddock is the hake (*Merluccius vulgaris*), which is rather different in appearance. Although it also belongs to the cod family, it is not a true member, for in place of the three dorsal fins of haddock and cod, it has one short, triangular dorsal fin, behind which is a long fin running right up to the tail. The general form of the hake is longer and more slender than that of the cod. It is, however, an important food fish.

Hague, THE (Pron hāg) This Dutch city, the political capital of the Netherlands, is situated two miles from the North Sea in a broad plain. It is prosperous and famed for its

cleanliness, but it is not a commercial city. The Dutch Parliament sits at The Hague and the ministerial offices and the supreme court are there. The royal palace, an 18th-century building, enlarged early in the 19th century, is the residence of the Court of Holland, and The Hague was for long the diplomatic capital of Europe, where many momentous international conferences were held.

Since 1899 The Hague has been the seat of the International Court of Arbitration, or Hague Tribunal, for which a splendid palace was built, largely at the expense of Andrew Carnegie, and since 1920 also the seat of the Permanent Court of International Justice which deals with disputes referred to it under international law.

The original Dutch name of the city was "'s Gravenhaag" ("the Count's Grove"), which is shortened to "den Haag." The name comes from the fact that long ago the counts of Holland had a hunting-lodge there. The city was once in a dense wood, most of which has now been cut down. Only a little patch is left between The Hague and Scheveningen, the most popular seaside resort of the country.

Broad, shaded, tree-lined streets intersected by many picturesque canals, and with fine old buildings, make the city one of the handsomest capitals of Europe. Its greatest pride is in its celebrated picture-gallery, the Mauritshuis. Here are masterpieces by the famous Dutch artists Rembrandt, Rubens, Van Dyck, Vermeer,

HAIG

and others There is also a very fine gallery of modern paintings, the greater number of which were collected by the eminent Dutch painter, Hendrik Willem Mesdag The population of the city is about 477,000

Haig, EARL (1861-1928) The British army owed much of its final success in the Great War on the western front to the courage and foresight of a scholarly gentleman of middle age with a firm jaw and steady grey eyes For the soldier on whom the British pinned their faith was Sir Douglas Haig, commander in chief of the British forces in France and Belgium from December, 1915, when he succeeded Sir John French, until the Armistice, November 11, 1918 (See World War)

At the beginning of the War Haig was a lieutenant-general in command at Aldershot, England's great training camp When the British Army crossed the Channel to hold up the first German avalanche, he commanded the 1st Army Corps In those black days his courage and optimism were a great help to the men, whose confidence he always held The costly failures of Neuve Chapelle and of Loos brought about the recall of Sir John French towards the end of 1915 Haig was the only possible successor, and in December, 1915, he became commander in-chief with the rank of Field-Marshal

Haig was born in Scotland, studied at Oxford, and joined the 7th Hussars in 1885 He saw his first active service under Kitchener in the Nile Expedition, where he distinguished himself and was raised to the rank of major He served also with distinction in the Boer War At the close of the War he was created Earl Haig of Bemersyde in the British peerage, and received a large number of other honours Haig founded the British Legion in 1921 and gave his name to the Poppy Fund He died in London on January 29, 1928

Hair. The possession of hair is a characteristic feature of the great group *Mammalia*, and was one of the factors which enabled mammals to develop so far beyond their ancestors, the reptiles This is because the outer covering enabled them to inhabit cold as well as hot climates, high as well as low altitudes Animals which live in cold regions—for instance, the reindeer and the polar bear—show a tendency to grow much heavier coats than those which live in a temperate climate In some mammals, like the pig, the hair develops into long, stiff bristles, in others, like the porcupine and hedgehog, the bristles form protective spines

In human beings no hair is found on the palms of the hands and the soles of the feet The hair of the head is protective, the presence of hair elsewhere is probably only a relic



HAIG IN LIFE AND IN BRONZE

Commander of the greatest army Britain had ever sent into the field, Sir Douglas Haig (as he then was) is seen in the upper photo congratulating Canadian troops after their advance in 1918 Below is his statue in Whitehall, London.

Top Canadian Official Photo



HAIR ROOT

When you pull out a hair, you see a little lump on its inner end. That is the bulb, which you here see embedded in the skin, and surrounded by the "follicle," which holds it in place (Magnified about a hundred times)

Photo H. S. Cheever

of the heavy, hairy coat worn by our remote, prehistoric ancestors. The hair of the human head and beard is constantly being shed and replaced. Most of the lower animals have "shedding periods" when the hair begins to come out and to be replaced with new.

Each hair grows at its root from a tubular "follicle" or sheath, formed in the papillae of the skin. It is provided with a blood-vessel which feeds it and carries away waste material, glands which provide oil to keep it moist and soft, nerves which control the contractions and expansions of the blood-vessel,

and a muscle (the "hair erector" or erector papillae) which by contracting makes the hair "bristle" or "stand on end," like the hair on the tail of an angry or frightened cat, or the hair of the coat of an angry dog, or of an animal which, when cold, "ruffs up" its coat.

Each hair is a strong, flexible, elastic thread, composed of many horny cells. Some hairs are straight, others wavy, and still others "frizzy" or woolly. Microscopic examination of a cross-section of a straight hair shows that it is round, while a curly hair is elliptical in a cross-section. Scientists have used these and other differences in the texture of human hair as a basis for classifying mankind into the straight-haired, the wavy-haired, the woolly-haired, and finally the frizzy-haired races. The first includes the Chinese and other yellow peoples and the North American Indians, the second the "white" peoples, the third the negroes, and the fourth the aboriginal Australians and Nubians.

The colour of the hair is due to pigments that are lacking in the white hair of the albino. The hair of the straight-haired, woolly-haired, and frizzy-haired peoples is uniformly black, while the varying shades of brown, yellow and red hair are found only among the wavy-haired peoples. Unhealthy conditions of the skin may affect the hair, making it dry or brittle, and causing it to fall more rapidly than it should. After fevers and severe influenza the hair will often fall from the head in masses, but will grow again vigorously when once the general health has been re-established.

The hair of many animals is of great economic value. The hair of the sheep, goat, camel, vicuña, alpaca, and other animals is woven into cloth, while that of rabbits, hares, and other mammals is made into felt for hats. Cow hair is used in making mortar and certain coarse cloths. The hair of horses is made into horse-hair cloth (used for stiffening garments and for upholstery) and into fishing lines. The hair of the camel, badger, and the bristles of the pig are used in making various kinds of brushes.

Haiti, REPUBLIC OF (Pron hā'-ti) The rugged island of Haiti lies in the centre of the chain of the West Indies, close to the east end of Cuba. Only the western third is occupied by the Republic of Haiti, but this area contains about three times as many people as the Republic of Santo Domingo in the east.

High mountains tower 7,000 feet above it, covered with valuable woods and filled with undeveloped mineral wealth in gold, silver,



STREET SCENE IN HAITI'S CAPITAL

In Port-au-Prince, the chief town of the republic of Haiti, the people are black, for they are the descendants of liberated American slaves. Yet their language is often French, for at one time this island was a colony of France. This is by far the largest city in the country, with a population of over 100,000.

HAITI

copper, iron, and coal. Rain fall is abundant, and the valleys are so fertile that the slightest cultivation makes them produce in tropical abundance.

Yet, in spite of its natural riches, no spot on earth was more neglected and poverty-stricken, until a few years ago, than Haiti. Revolutions and misgovernment had reduced it to a miserable condition, and its capital, Port au Prince, was avoided by even the most enterprising travellers because of its filth. Then in 1915 a treaty was made with the U.S.A. whereby they were to control some of the public services until 1936.

United States "occupation" did much to clean up the country and to stamp out disease. The broad streets of the capital are now paved with asphalt, and scores of motor cars may be seen on them. The refuse and smells, nuisances of the past, are no more, children attend school, electricity lights the capital, and a short tramway line is in operation in addition to the railway which connects the city with other important towns. The adjustment of taxes has given more incentive to agriculture.

Besides coffee, which still remains the chief export, Haiti produces increasing amounts of cotton, sugar, cacao, sisal, and pineapples. Logwood (used for dyeing) and other valuable woods are exported, and plans are being made for the development of mineral wealth.

Despite improved conditions, Haiti clamoured for independence, and in 1930 it held its first parliamentary election in 15 years. An executive agreement in 1933 provided for the withdrawal of American troops in October, 1934. Few services now remain under American control.

Haitians are nominally Roman Catholics, but Voodoo worship, a survival of African fetishism, still flourishes. French is spoken throughout the Republic. Area, 10,200 square miles. Population, about 3,000,000.

Haldane, JOHN BURDON SANDERSON (b 1892). This brilliant son of a brilliant scientist father, Professor John Scott Haldane (1860-1936), and nephew of the lawyer-philosopher statesman Lord Haldane (q.v.), was trained in biology from his earliest years. Research was in



DOING THE WASHING IN HAITI

Dealing with the laundry is not a very arduous business in Haiti. The housewife takes the washing to the nearest stream, and there, squatting on the bank, washes the clothes in the running water and dries them in the sun.

biologists whose principles placed more insistence on the influence of environment than on individuality in the totality of a living organism, and thereby introduced into the study of biology a new philosophical basis.

From 1930 to 1932 Haldane was Fullerman Professor of Physiology at the Royal Institution, after which he was made professor of genetics at University College, London. Previously he had been head of the genetical department of the John Innes Horticultural Institute and President of the Genetical Society. His work on genetics has, in recent years, greatly advanced farm stock breeding, for which these islands have always been noted.

Apart from numerous scientific papers

HALDANE

his blood, it may truthfully be said, for throughout his distinguished career he has displayed abilities and mental penetration akin to those which made his father famous in biology and physiology.

Born November 5, 1892, and educated at Eton and Oxford, young Haldane served throughout the World War (1914-1919) with the famous "Black Watch" regiment, and was twice wounded. On his return he was elected a fellow of New College, Oxford, where he remained until 1922, when he became reader in Biochemistry at Cambridge. Here he soon won for himself an established reputation. His papers recorded many valuable discoveries, often achieved by dangerous experiments on himself, and the startlingly provocative tone of the more speculative of them commanded a wide public.

With Julian Huxley (q.v.) Haldane was the leader of the brilliant school of young



J B S HALDANE

This scientist, in whose family great intellectual gifts run, is one of the most brilliant of the younger school of biologists.

Photo Kay Vaughan

Haldane published "Daedalus" (1924) and "Callinicus" (1925), both of which enjoyed an immense public favour, comparable with the works of Jeans. In 1927 appeared "Possible Worlds" and, with J S Huxley, "Animal Biology," to be followed in 1928 with "Science and Ethics," "Enzymes" (1930), "The Inequality of Man" (1932) and in 1933 "Causes of Evolution" "My Friend Mr Leakey," (1937), written expressly for children, is a fantasy about a scientific magician

Trying it out on the Boy!

J B S Haldane's father was, as stated above, Professor John Scott Haldane, a physiologist whose work on numerous Royal Commissions and Board of Trade inquiries, particularly into the dangers of the coal mining and gas industries, testified as much to his courage as to his scientific genius. For example, he devised a gas-proof apparatus and, to test it, he had himself sealed up in a chamber filled with deadly fumes!

Speaking of how his father believed in testing theories under natural conditions, the son relates the following

"I am afraid I am not any of the things that appear to be required of the scientist," he said "I have passed no examinations in science at any university. I am only a quack. I have not been brought up to take science seriously, because it was part of my life

"When I was three, my father started experimenting on me by taking samples of my blood. At the age of eight, I was taken down a coal mine in a bucket, and told to stand up near the roof, and say something

"I recited, 'Friends, Romans, Countrymen,' but before I got to 'The evil that men do,' I tumbled down. That taught me quite a lot about fire damp

"A little later, the British Navy was so frightened of diving that the authorities said that before a man could go down 40 ft., he must have months of training. My father thought that anybody could go down 40 ft. at once, and, to prove it, he said, 'Here is my son. He is only 13. Throw him overboard'

"I went down all right, but the diving suit was too big for me, and when I was hauled up it was full of water up to the neck. In that way I found things out."

Professor John Scott Haldane, who was the author of "Organism and Environment" (1917), "The Sciences

and Philosophy" (1929), "The Philosophical Basis of Biology" (1931) and "Materialism" (1932), died March 14, 1936. Characteristically enough, his son submitted to a blood transfusion in a last effort to save his father's life

Haldane, RICHARD BURDON HALDANE, 1ST VISCOUNT (1856-1928) "Germany is my spiritual home" these words spoken by Lord Haldane in the days before the World War were sadly misused against him when he became Secretary of State for War, and eventually caused him to be deprived of Cabinet office in 1915. Yet Haldane, who was primarily a philosopher, was referring only to the predominant German philosophy when he spoke those words, and was far from being a "pro-German," as his record as War Minister shows

Indeed, Lord Haig called him "the greatest Secretary of State for War England has ever had," and certainly he had constructed a remarkably efficient, if small, military machine which enabled 160,000 men to be in position within 12 days of the declaration of war

Son of a Scottish lawyer, Haldane studied philosophy, but pursued the law, becoming Q C in 1890, having entered Parliament in 1885. He became War Minister in 1905, estab-

lishing the Officers' Training Corps, replacing the Militia with a reserve, establishing the Territorial Army, creating the Imperial General Staff

Haldane was Lord Chancellor in 1924, and led the Labour party in the House of Lords. He became a peer in 1911, and was awarded the O M. His philosophical works include "The Reign of Relativity" (1921), "Philosophy of Humanism" (1922), and "Human Experience" (1926). He was largely responsible for establishing some of the younger universities, like Bristol, and he was greatly interested in the Workers' Educational Association

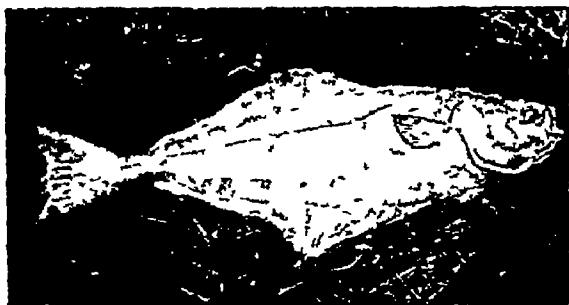
Halibut. *Hippoglossus vulgaris*, as the halibut is called by naturalists, is perhaps the greatest of all the flat fish tribe. Its flesh



LORD HALDANE WITH LORD KITCHENER

That Britain's army was ready to meet the great test in August, 1914, was very largely the work of Lord Haldane, who was Secretary for War from 1905 to 1912. Here we see him entering the War Office with Lord Kitchener soon after the outbreak of hostilities.

HALIBUT



W. S. Derridge

A REALLY BIG HALIBUT

The most important of the flat fish, from the point of view of food value, the halibut is also the largest member of this group, and it ranks as a big-game fish in certain districts. Here is a very large specimen, which shows a greater length, in proportion to its breadth than most fish of this type

is valuable as food, and the oil of its liver is an even richer source of vitamins A and D than is cod liver oil. Halibut are sought by deep sea anglers for sheer sport, one great centre for this kind of deep-sea fishing being Valencia Island off the coast of Kerry. Great catches are regularly landed at Grimsby and Hull by ocean going fleets of steam trawlers which range as far north as Iceland, the White Sea and Bear Island in quest of halibut.

Halifax, NOVA SCOTIA

"The Warden of the North" was the name given to Halifax, the capital of Nova Scotia, by Rudyard Kipling, because it is the greatest fortress and chief naval station of the British Empire in North America. It has occupied this position almost from the date of its founding by the British in 1749. When the English troops were driven out of Boston, in the first year of the American Revolution, they sailed away to Halifax to reorganize.

Halifax was of great importance during the World War. Besides being Canada's chief winter port it is about one day's steaming nearer Great Britain than New York. For these reasons transport and munition ships made Halifax a terminal port of departure and arrival.

On December 6, 1917, a French vessel carrying a large cargo of munitions collided with a Belgian relief ship in the harbour, causing a

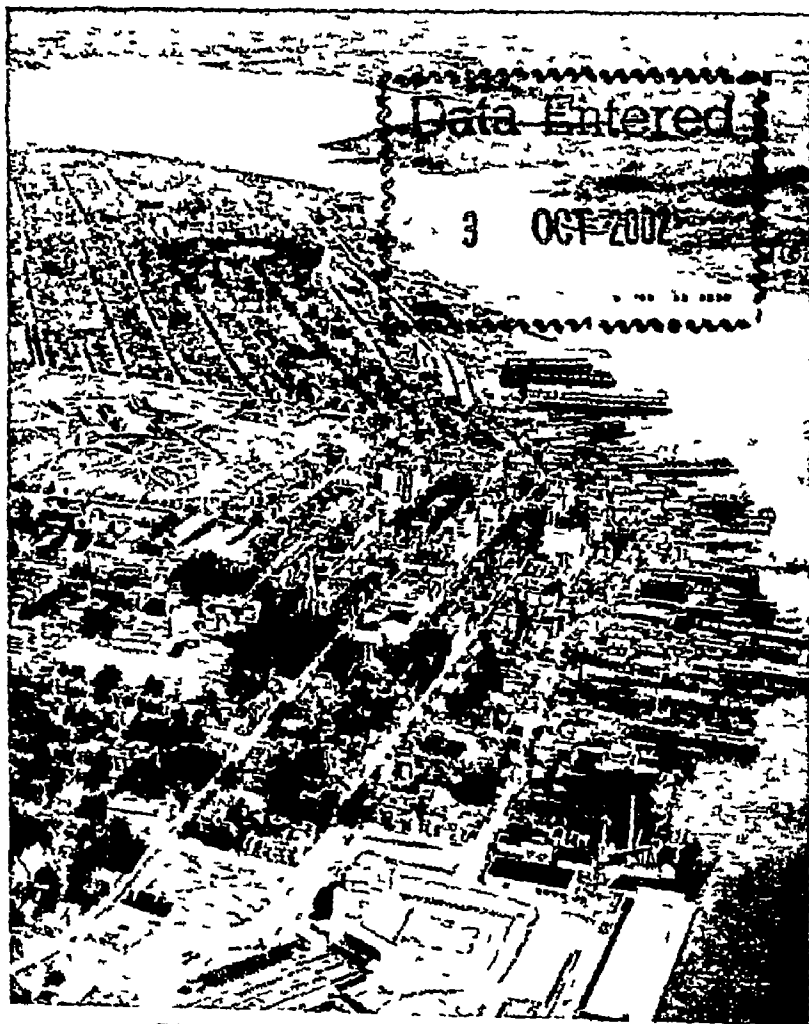
HALLOWE'EN

terrible explosion and fire which killed 2,000 persons and devastated an area of about 2½ square miles on the north side of the city.

Its favourable position and its magnificent harbour make Halifax a great commercial centre. Because of this the Canadian government has spent £8,000,000 in improving the shipping facilities. It has built huge railway sidings, where transcontinental trains can run alongside the great Atlantic liners.

Manufactures of importance have also grown up. Raw sugar is brought in from the West Indies and is refined in the largest refinery in Canada, an extensive oil refinery has been established, and foundries and machine shops make and repair equipment used by the great transportation companies. The population of Halifax is about 60,000.

Hallowe'en. Strange things may happen to one on Hallowe'en, so superstitious folk used to believe, for they thought that



WATER-FRONT OF CANADA'S HALIFAX

One of the most important ports of Canada, and the capital of Nova Scotia, Halifax is a fine city with a magnificent harbour, which you see here together with some of the great docks which lie along the city's water-front. The large open space and regular buildings in the centre are the remains of an ancient fortress, now a military college.

Canadian Official

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witches then rode abroad on broomsticks, elves played pranks on sober folk, and the future might be foretold by jumping over a lighted candle, or by any of a hundred other magic rites

Many of these strange superstitions have come down to us from our pagan ancestors of 2,000 years ago and more, for our Hallowe'en occurs about the time of the ancient Druidic autumn festival. This was also the season of the ancient Roman festival in honour of Pomona, goddess of fruit and gardens, and so, after the Roman conquest of Gaul and Britain, some of the Roman beliefs and ceremonies were added. Later, after the spread of Christianity, November 1 was a day for the honouring of all the saints,



APPLE-BOBBING ON HALLOWE'EN

This is one of the oldest of the many ceremonies connected with Hallowe'en, and in Wales, where this family are engaging in it, it is called "Afalau bach yu-y-dwr." Kneeling in front of a tub of water, you try to pick the apples out with your teeth—which is more difficult than it sounds.

and the eve of that day was called "Hallowe'en" (or "All Hallow-Even"), meaning the "holy eve" of All Saints' Day. Many of the old pagan customs were retained, and so we still crack nuts, and bob for apples, and throw apple peelings over our shoulders and so forth.

Hals, FRANS (Pron hahlz) (1580?–1666) The world-famous Dutch painter, Frans Hals, who is now recognized as one of the greatest portrait painters of all time, was almost forgotten, and his work was ignored for two centuries after his death. So slightly was he esteemed that some of his paintings were sold for a few pounds. Yet of late years as much as £26,775 has been paid for a single work by him. Critics today put him next to Rembrandt at the head of the Dutch school, and some call him the greatest painter for truth of character.

Born in Antwerp, Hals moved to Haarlem, in Holland, when he was a young man. In 1616

he began the first of the great series of shooting-guild groups and public officials that show his genius so well. In the Town Hall of Haarlem, 84 men and women look down from the walls in eight great canvases. The last of the series was painted in 1661, when Hals was over 80. There on the walls may be traced the artist's development. The picture painted in 1633 reveals him at his most vigorous period, when his brilliant colour and quick grasp of fleeting expression were at their height. The later groups are painted with great skill, but the colouring has been toned down to sombre grey tints. Does the greyiness of these last pictures reflect the sadness of the poverty-stricken painter's declining years?

Many other examples of Hals's work are scattered throughout the world in public and private galleries. Best-known of all his works is "The Laughing Cavalier," which is in the Wallace Collection in London. Many others, from small portraits to big family groups, are to be seen in the great art galleries of the world. Although he did many fine portraits and paintings of the upper classes, it is perhaps for his rollicking tavern scenes and groups of musicians that this fine painter is now best loved.

Hamburg, GERMANY Strange as it may seem, Hamburg, which is Germany's greatest seaport, lies many miles inland. Situated on the north bank of the river Elbe, 75 miles from its mouth, Hamburg bestrides a little stream called the Alster. A dam has been constructed at this point, forming two lakes as harbours in the heart of the city, which presents a singular combination of land and

water life. Dredging keeps the river navigable. The older part of the town, to the east, is intersected by a great number of narrow canals, lined with warehouses and squat dwellings that seem to rise right out of the water. Barges loaded with merchandise ply up and down these canals, and people may go and come from home to business in pleasant little steamers. Great sea-going vessels can come at high tide to the heart of the city, to unload their cargoes.

Hamburg was a "free city" and retained its constitution under the German Empire. Since 1933 it has been under the rule of a governor who is the personal representative of the Chancellor. The territory under its rule covers an area of about 160 square miles, including the outlying port of Cuxhaven at the mouth of the Elbe, with its tremendous system of docks.

Viewed from the left bank of the Elbe, Hamburg, and the adjoining Prussian town of Altona,

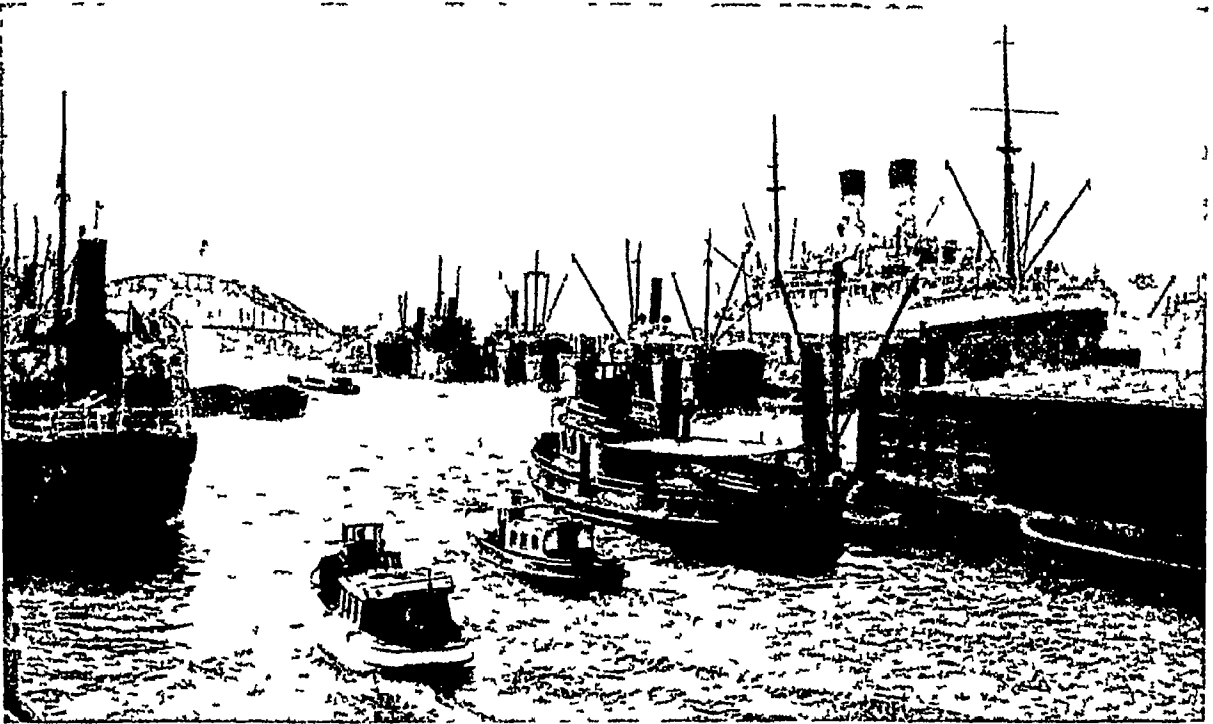
'THE LAUGHING CAVALIER' PAINTED BY HALS



Here is Frans Hals' 'Laughing Cavalier,' one of the most famous portraits ever painted. The title itself is something of a mystery for the sitter is hardly laughing but there is no doubt about the superb craftsmanship and artistry which have gone to make this picture. The breadth and strength of the painting, for example of the man's sash may be contrasted with the perfection of detail in the ruffles of his neck and cuffs, while the face is a perfect character-study by itself. In every branch Frans Hals shows himself a master. This painting is in the Wallace Collection, London.

Photo by F. Mansell

HAMBURG



IN HAMBURG'S HEART

Ancient and modern rub shoulders in the city of Hamburg, Germany's greatest seaport. Not far from the busy harbour on the banks of the Elbe (above) is St. Nicholas Church, glimpsed below through one of the narrow "fleets," or waterways, of the old city

Photos Dorien Leigh Underwood

look like one city. With a continuous river frontage of ten miles, crowded with shipping in normal times, and with its densely packed houses in the background surmounted by lofty church spires, the city gives an impression of massive grandeur. On the borders of the Binnen Alster, the smaller of the two lakes, are grouped fashionable avenues and the more important business streets, lined with magnificent buildings.

In the Hopfenmarkt, one of the largest public squares, stands the church of St. Nicholas (Nikolaikirche). Built as a memorial of the fire of 1842, it is the third highest religious building in the world, its spire soaring 483 feet above the street level. The new Rathaus is the most important of the secular buildings. The hospital at Eppendorf is one of the finest in Europe. Hagenbeck's zoological gardens, which formerly contained the largest and most complete collection of wild animals in captivity, are also noted for life size models of prehistoric monsters. The site of the old ramparts and fortifications has been converted into gardens.

Hamburg has its origin in a fortress and bishopric founded here by Charlemagne in 808-811. Its importance as a centre of commerce began in the 12th century when the Emperor Frederick I granted it free navigation of the Elbe, with the right of levying toll on foreign shipping. In 1241 it joined in the formation of the Hanseatic League and became the seat of its upper court (*See Hanseatic League*). This gave a tremendous impetus to its rapidly increasing wealth and commercial importance. In 1510 Maximilian I reorganized Hamburg as a free imperial city. Under Napoleon the French occupied the city from 1806 to 1814.

Hamburg's modern greatness came in the middle of the 19th century with the development of great steamer lines to all parts of the world. Lying on the most southeasterly inlet of the North Sea, with a harbour ice-free all the year and with waterways to carry goods cheaply to the interior, it soon became the chief seaport of continental Europe. Its industries include shipbuilding, machine works, sugar refining, chemical manufactories, corn and oil mills and the clothing trade. Hamburg's population is about 1,200,000.

Hamilton, ALEXANDER (1757-1804) The most brilliant of all the men who aided in founding the Republic of the United States, and in framing and setting up the government under the Constitution, was Alexander Hamilton.

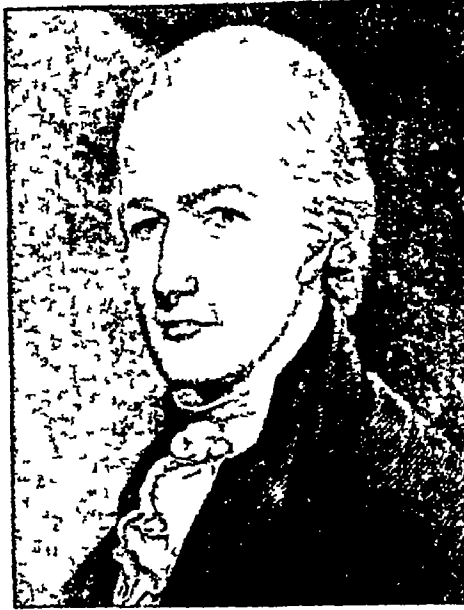
In spite of his youth (he was not yet 20 when the war began) he was one of Washington's most trusted helpers. Hamilton's history was as unusual as the man himself. Born in the island of Nevis, in the British West Indies, he early displayed a talent for writing.

As soon as the Revolutionary War began he entered the army, and was early made captain. Then for four years (1777-81) he was on Washington's staff with the rank of lieutenant-colonel. He took a brilliant part in the field in the campaign which ended with Cornwallis's surrender. Later his advocacy of a strong central government for the new born nation earned him the title of "the greatest constructive statesman in United States history."

President Washington appointed Hamilton the first Secretary of the Treasury, and, while holding office, he established a National Bank and enacted a tariff which should "protect infant industries." No American statesman ever had greater tasks to face than had Hamilton, and none was more successful in meeting them.

As a result of Hamilton's persistent opposition to him, Burr, his political rival, finally challenged Hamilton to a duel. According to the accepted code of honour in his day, Hamilton could not refuse the challenge. On the morning of July 11, 1804, they met at Weehawken, and Hamilton fell mortally wounded, and died the next day, aged only forty-seven.

'Hamlet.' By almost universal consent this is regarded as Shakespeare's greatest tragedy. The opening of the play reveals



ALEXANDER HAMILTON

In the difficult days when the United States of America was taking its first steps as an independent nation Alexander Hamilton was ever ready with good counsel and support. Here we see him as represented in a contemporary miniature.

Hamlet, the young Prince of Denmark, plunged in bitter grief by the sudden death of his royal father, who, according to report, had died of a serpent's sting. The fact that the queen, his mother, has almost immediately married the dead king's ill-favoured brother, adds to the Prince's sorrow. To him appears from the tomb the dread spirit of his father, revealing that, "sleeping, by a brother's hand" he had been put to death, and calls upon Hamlet to revenge this "foul and most unnatural murder."

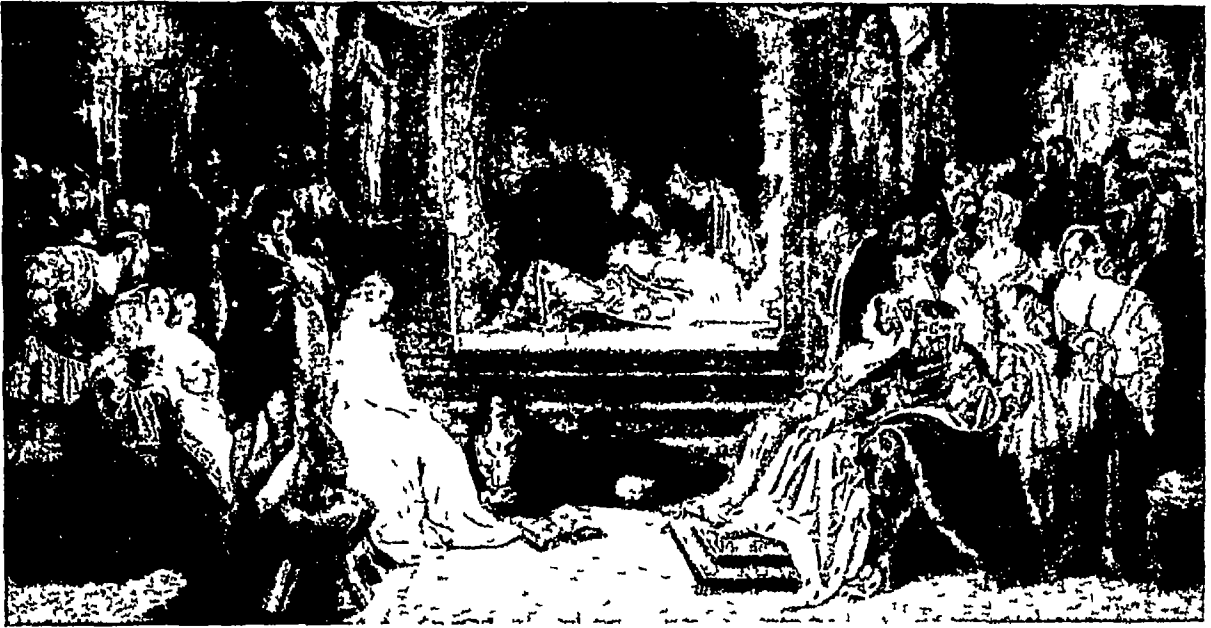
Hamlet's brilliant, sensitive mind is thrown into feverish activity by the horror of this deed, yet he would make sure of his uncle's guilt. He feigns

insanity, the better to watch the guilty pair, and in a court play gets the actors to insert a scene like that of his father's murder, so that he may observe its effect upon the usurping king. The latter's confusion confirms the ghost's revelation, but Hamlet, distracted between his grief and his inability to form a plan of revenge, contemplates his own suicide. "To be or not to be"—to live or die—he muses bitterly, "that is the question"—

Whether 'tis nobler in the mind to suffer
The slings and arrows of outrageous fortune
Or to take arms against a sea of troubles,
And, by opposing, end them? To die to sleep,
No more, and, by a sleep, to say we end
The heartache, and the thousand natural shocks
That flesh is heir to, 'tis a consummation
Devoutly to be wished. To die, to sleep,
To sleep 'perchance to dream'—ay, there's the rub
For in that sleep of death what dreams may come
When we have shuffled off this mortal coil,
Must give us pause. There's the respect
That makes calamity of so long life,
For who would bear the whips and scorns of time
The oppressor's wrong, the proud man's contumely,
The pangs of despised love, the law's delay,
The insolence of office, and the spurns
That patient merit of the unworthy takes
When he himself might his quietus make
With a bare bodkin? Who would fardels bear,
To grunt and sweat under a weary life,
But that the dread of something after death
The undiscovered country from whose bourn
No traveller returns, puzzles the will,
And makes us rather bear those ills we have
Than fly to others we know not of?

Thus conscience does make cowards of us all.

While Hamlet thus postpones revenge, the king resolves on Hamlet's instant death. But before he can effect it, Hamlet has, by accident, slain old Polonius, whereupon the



DRAMATIC MOMENT IN SHAKESPEARE'S 'HAMLET'

Here is the intense scene which occurs in Shakespeare's "Hamlet," when the king sees, reproduced in a play, the murder which he himself has committed. Lying on the ground, at Ophelia's feet, is Hamlet himself, the old man standing opposite him is Polonius, Ophelia's father, and behind her chair is her brother, Laertes. This scene is reproduced from an engraving done after an original painting by Daniel Maclise.

daughter of Polonius, Ophelia, a gentle girl with whom Hamlet is much in love, goes insane and drowns herself.

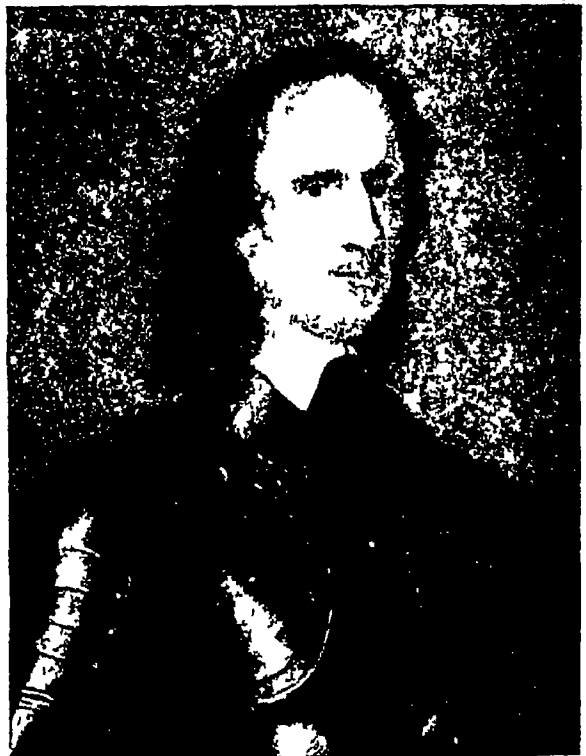
Laertes, the son of Polonius, swears hot revenge, and is thereupon ensnared by the king to carry out his own wicked designs. A duelling match is planned with Hamlet, in which Laertes, by the king's advice, shall use an untipped foil, poisoned at the point, while the king will furnish a cup of poisoned drink to quench Hamlet's thirst.

In this tragic duel and end of the play, Hamlet is, indeed, slain as planned, but in the scuffle Laertes himself is pierced with his own envenomed sword. The queen, by mistake, drinks the poisoned cup and dies, and Hamlet in the instant of his death stabs the wicked king. About the only comic relief to the play is the dialogue of the grave diggers who dig the grave of "the fair Ophelia."

It has always been the ambition of every serious actor to play "Hamlet," and his success in the part has usually set the hall-mark upon his ability. Sarah Bernhardt played the part, and, among other great actors, Sir Henry Irving, Sir Johnston Forbes Robertson, Sir John Martin Harvey, and John Gielgud.

Hampden, JOHN (1594-1643) "Patriot" Hampden lives in history as one of the most gallant and determined of the band of Puritan statesmen who opposed the autocratic government of Charles I and so brought on the Civil War. He was a man of wealth and position, a cousin to Oliver Cromwell, and one of that leader's ablest supporters and advisers.

By refusing to pay the illegal ship money tax, levied by the king, Hampden became a popular hero and a central figure in the early stages of the Puritan Revolution. At his trial in 1637,



JOHN HAMPDEN

A great patriot and a great soldier, John Hampden is remembered for his resistance to Charles I's unjust impositions and for his part in the Civil War that followed. This portrait is said to be by Richard Walker, who painted what is usually considered the best portrait of Oliver Cromwell and portraits of many other prominent Parliamentarians.

National Portrait Gallery

HAMPDEN

seven of the 12 judges voted against him, but public opinion was in his favour and the opposition to the government was immeasurably strengthened. In the early days of the memorable Long Parliament (1640-60) Hampden was right-hand man to the redoubtable John Pym, then leader of the Puritan cause, and was one of the five members whose attempted seizure by King Charles on January 4, 1642, led rapidly to armed conflict.

When hostilities began, Hampden joined the Parliamentary army, contributed liberally to its support, raised a regiment of infantry, and



in the struggle displayed great bravery and generalship. He was mortally wounded at Chalgrove Field, June 18, 1643, and died on June 24.

Hampshire. In gentility of climate and in variety and charm of scenery few English counties can claim to surpass Hampshire. It is mainly an agricultural county, and large numbers of sheep and pigs are reared. Inland, it is sparsely populated, but this is compensated for by the large towns on the coast, which include Portsmouth, Southampton and the seaside town of Bournemouth, whose equable climate makes it popular as a winter as well as a summer resort. At Eastleigh, five miles north of Southampton, the Southern Railway has important engineering works. The county

HAMPSHIRE

town is Winchester (*q v*). In Hampshire are not only the greatest British naval base, Portsmouth, and the most important military station, Aldershot, but also a number of R A F aerodromes and seaplane stations.

The chief glory of the county is the New Forest, lying between Southampton and the river Avon, and having an area of 144 sq miles. A few deer still roam about this old hunting ground of the Norman kings. A stone, known as the Rufus Stone, in one of the glades, is supposed to mark the spot where William Rufus was killed by an arrow, said to have been shot

by Sir Walter Tyrrell (See page 1486). The first cricket club in England was formed at Hambledon. In the county are the ruins of the Abbeys of Netley and Beaulieu (pronounced *bū'-li*), and two very beautiful churches, Romsey Abbey and Christchurch Priory. The chief rivers are the Itchen, Test, Avon, Hamble and Lymington. Hampshire, called Hants for short, and officially known as the County of Southampton, includes the Isle of Wight, which, however, has a separate County Council.

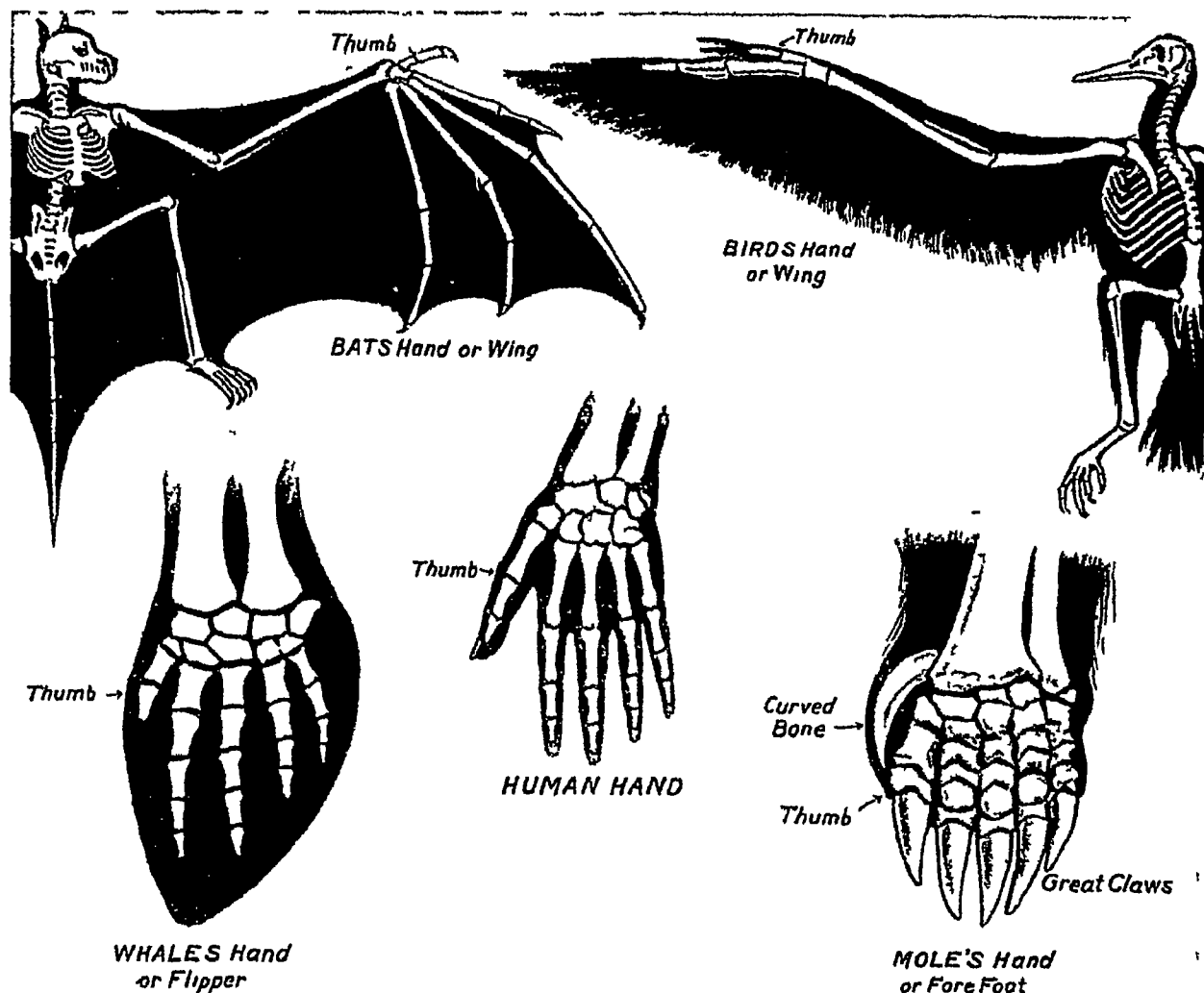
Jane Austen was born at Steventon Rectory, and passed most of her life



FAMOUS ABBEY AND BRIDGE OF HAMPSHIRE

On the fringe of the New Forest is the village of Beaulieu, where stands a Cistercian abbey founded by King John in 1204. Its cloisters are seen at the top. The lower photograph is of the ancient stone bridge over the River Avon at Christchurch, still the only means of crossing the river in this vicinity.

Top J. Dixon Scott bottom W. Brown



'HANDS' FOR FLYING, SWIMMING, DIGGING, AND GRASPING

While the human hand is the most perfect instrument of all, other creatures also have "hands" adapted to various purposes. The fingers of the bat, as you can see, have grown very long to support his wings, the "thumb" remaining free to be used as a clinging hook. The bird's "hand" has lost almost all its fingers, stiff feathers taking their place. The whale's hand is broad and short, but all the fingers are plainly represented. The mole not only has the usual five digits, but also an extra bone to make his digging palm even broader, and his "finger nails" have developed into huge claws.

in the county, and Hampshire is the scene of White's "Natural History of Selborne" Area (including the Isle of Wight), 1,632½ sq miles. Population about 1,014,000 (See Portsmouth, Southampton, Wight, Isle of, etc.)

Hand. The human hand is a wonderful piece of mechanism. Placed at the end of the arm, with the ball-and-socket joint at the shoulder, the hinge joint at the elbow, and a peculiar joint at the wrist, it has indeed a marvellous range of movement.

The eight bones of the wrist are called "carpal" bones, the five of the palm are the "metacarpals," and the 14 in the fingers are the "phalanges." All these bones are bound together by tough flexible ligaments.

The muscles that move the hand are mostly upon the forearm, and have long tendons connecting them with the different bones. You can feel and see some of these tendons in your wrist when you bend your fingers. There are

more than 30 pairs of muscles producing hand motions. The thumb is arranged so as to work against the fingers in very useful grasping movements. Just "make-believe" that you have no thumb and try to pick up something.

Sensibility is highly developed in the hand. There are many little elevations or *papillae* on the skin of the palm, and fine nerve fibres extend from these to the brain. Thus the skin is made very sensitive to touch, heat and cold.

Because it possesses both strength and lightness of touch, the hand is wonderfully adapted to all sorts of uses. The hand is the instrument with which the brain of Man accomplishes its greatest direct achievements.

Handel, GEORGE FREDERICK (1685-1759) Handel's "Messiah" is so often performed at Christmas that it has almost become part of the tradition of the season.

Although Handel was born a German, he won his first great fame in Italy with his Italian

A KING PAYS TRIBUTE TO HANDEL'S MUSIC



Although the English public of his day had come to expect great things of Handel, none were prepared for such glorious musical effects as those obtained in his oratorio 'Messiah'. When presented by a mighty chorus and superb orchestra, the masterpiece took England by storm and led to as graceful a tribute as has ever been given music by royalty. King George I, swept away by enthusiasm during the earlier portions of the work, rose to his feet and stood during the performance of the 'Hallelujah Chorus' and thus created the custom, which still exists, of standing during this portion of the oratorio. Handel was so impressed with the reception given his work in England that he gave up his German citizenship and became a naturalized Englishman.

operas. He later became an English citizen, and today Handel is chiefly remembered for his English oratorios.

The father of Handel, a German doctor of Halle, was much opposed to his son's musical ambitions. But the boy was filled with a desire to learn to play the spinet (an early form of the piano), and at the age of eight years had so well taught himself that, when the opportunity was presented him to play the organ in the castle of a neighbouring duke, he carried it off with such skill that the duke persuaded the lad's father to give his son a musical education.

At the age of 11 Handel was master of the organ, clavichord, violin, and other instruments, and was proficient in musical composition. When he was 20 years of age he produced his first opera, which was favourably received. He went to Italy to study the Italian style of opera, and there his brilliant performances on the harpsichord won him the highest recognition.

Handel's First Visit to London

Handel next came to London, where his triumph was repeated. England offered so much in the way of opportunity and appreciation that, when 41 years of age, Handel became a naturalized Englishman. Seven years later he began his career as an English composer, using from that time only English texts for his oratorios. To these his greatest fame is due. Other musicians were composing operas, but English oratorio, as composed by Handel, was quite new. The English people loved his music, and the royal family were always his staunch supporters. Handel grew old, blessed by the comfort of his music, and many friends. The bitterest trial of his life came in his later years, when he became totally blind. Yet he still played, and conducted his oratorios.

Handel will never cease to be revered as one of the greatest of composers. Besides his 18 English oratorios, his works include 41 Italian operas, 2 Italian oratorios, 4 English secular oratorios, 3 volumes of English anthems, 1 volume of Latin Church music, 3 volumes of Italian vocal chamber music, 37 instrumental duets and trios, and 4 volumes of orchestral music and organ concertos.

Handwriting. Good handwriting is an invaluable accomplishment. In acquiring it, both speed and quality should be moderate in the beginning, and should improve together. Over-emphasis on speed produces a scrawl, and over-emphasis on form produces laboured writing, which is apt to lose in quality compared with more fluent writing.

It is well for the beginner to write for several months on the blackboard alone. The large free movement of the whole arm at the board is much easier to control than the more delicate movement of the pen or pencil. When the

child first writes on paper he should use a soft smooth pencil, and should write a coarse hand on large sheets of comparatively rough paper. The pen may be introduced in the third grade.

The paper should be directly in front of the writer, with the top tilted about 30 degrees to the left. The pen should be held lightly, and the hand placed with the palm pretty well down, and sliding easily on the nails, or the first joints of the last two fingers. The writing should be carried on with an easy, rhythmical movement.

Hangchow, CHINA. When Marco Polo, the greatest of medieval travellers, visited Hangchow, towards the end of the 13th century, he declared it was the finest and noblest city in the world. It still ranks as one of the richest cities in China, though it has lost much of its ancient magnificence. Its shops are noted for their size and the excellence of their stocks, and its silk, paper fans, tapestries, ivory carvings, and lacquered ware are famous.

Hangchow is about 100 miles south-west of Shanghai, lying near the head of the estuary of the Tsien-tang River, 50 miles from the ocean. Although the river is visited at certain seasons by destructive "bores"—great tidal waves 15 feet high, which rush up stream at the rate of 15 miles an hour—it is constantly crowded with small craft, which carry vast quantities of merchandise to and from the southern provinces. An immense amount of traffic is also carried by the Grand Canal, which ends here.

Just outside its massive walls, 12 miles in circuit, lies the famous Si-hu or West Lake, which travellers account one of the most charming scenes in China, with swarms of gaily painted boats plying between the villas, shrines, and monasteries that line its banks and cover many small islands. Thousands of pilgrims visit the Buddhist temples near by. The population of Hangchow, which fell to the Japanese invaders on December 24, 1937, is about 500,000.

Hankow, CHINA. To reach the important town of Hankow, you must travel 600 miles up the Yangtze River from Shanghai.

Hankow's waterfront, on the north bank of the Yangtze, is a long straight stone-paved *bund*, half a mile wide, and exceedingly busy. Facing it are the handsome buildings of the foreign concessions, which look out across a broad, carefully kept, tree-lined boulevard, where an endless procession of men, women, and children travels afoot to and from the yellow surging river choked with traffic—gunboats, steamers, tugs, lighters, junks, and sampans. Here is the centre of Hankow's commerce in tea and iron.

Threading your way through streets filled with wheelbarrows and pedestrians, you soon come in sight of the countless chimney stacks of the Hanyang Iron and Steel Works. The works own and operate their own coal-fields,

HANKOW

290 miles up the river, and ore deposits, 70 miles down the river, and 17 miles inland. Both coal and ore come to the mills by water transport.

Other industries are cotton, hemp, flour mills, and tanneries. Oil is stored in great tanks for distribution. The city is an important point on the railway between Peking and Canton. More or less modern machinery is used in these plants and some of them are under foreign management and have foreign capital.



TAI PING ROAD, HANKOW

This is a typical street in Hankow, one of China's greatest cities, captured by the invading Japanese on October 25, 1938. Over three quarters of a million people live in Hankow and its neighbour cities of Hanyang and Wuchang, and a vast volume of commerce flows through its harbour. It was a treaty port having been opened to foreign trade in 1862.

invested in them. The population of the three closely connected cities of Hankow, Hanyang and Wuchang is about 800,000.

Hannibal, (about 247-183 B.C.) The boy Hannibal stood at the altar beside his father, the great Carthaginian general, Hamilcar Barca, and repeated this solemn oath of enmity against his country's powerful rival. "I swear that so soon as age will permit, I will follow the Romans both at sea and on land. I will use fire and steel to arrest the destiny of Rome."

The warrior and his young son were setting out together for Spain, where Hamilcar hoped to gain conquests that would compensate Carthage for the possessions that Rome had wrested from her in the disastrous war recently ended—the First Punic War. He was taking Hannibal with him that he might learn the ways of war and, also, to prepare to renew the death struggle with Rome for the supremacy of the Mediterranean.

HANNIBAL

So well did Hannibal learn his lesson that, after his father's death, he succeeded to the command of the army in Spain, and three years later (218 B.C.) was prepared to renew the contest to which he had been dedicated. While the Roman Senate was planning invasion, Hannibal was already starting on the most daring march known to the ancient world.

Along the eastern coast of Spain, over the Pyrenees, and across the swift waters of the

Rhône, he led his forces of fifty thousand foot soldiers, nine thousand horsemen, and scores of elephants. It was already autumn and the cold was intense when this band, accustomed to the sunny lands of Africa and Spain, began to cross the perilous Alps. Blinded and almost overwhelmed by snow storms, over steep and narrow paths they struggled, cheered and encouraged by their dauntless leader. In places the natives rolled heavy stones down the mountain sides upon them, many men slipped down the icy precipices and were killed; others perished of cold, hunger, and exhaustion, so that the army was reduced to less than half its original number when it descended upon the plains of northern Italy.

By the skilful use of his cavalry, in which the Romans were weak, Hannibal won two great victories, at the river Trebia and at Lake Trasimene. Alarmed at these disasters, which had shattered one army and nearly destroyed another, the Romans appointed a dictator—an official invested with extraordinary power. Their choice fell upon a wise statesman named Quintus Fabius Maximus. Instead of risking an engagement at once, Fabius adopted a policy of following the Carthaginian army, delaying it and harassing it in every possible way. From this he was nicknamed *Cunctator*, or "delayer," and from him comes the expression a "Fabian policy" for one of caution and deliberation.

At last, in the summer of 216 B.C., a Roman army of between 70,000 and 100,000 met Hannibal's force at Cannae, near the south-eastern coast of Italy. Though far outnumbered, Hannibal managed by clever strategy to surround the forces of his enemy, and to annihilate them. Ex-consuls, senators, nobles

thousands of the best citizens were among the 60,000 slain. Of the gold rings which they wore as an indication of their rank, Hannibal is reported to have sent a bushel to Carthage.

But the victory bore little fruit, for Hannibal was one man fighting against a united nation. He failed to receive support either from his own countrymen, or from the Italians whom he subdued during the 15 years that he remained in Italy. His brother Hasdrubal, coming to his aid with reinforcements from Spain, was met by a Roman force, completely defeated, and slain.

Still Hannibal struggled on, until a Roman army under Scipio Africanus invaded Carthage, and he was forced to return home. At Zama, in his own country, the lion-hearted commander, who for 15 years had ravaged Italy, suffered a crushing and final defeat. The battle for supremacy was ended and Rome was mistress of the Mediterranean.

Hannibal now showed that he could be a statesman as well as a soldier. Elected chief magistrate, he reformed and strengthened the government of Carthage and contrived to pay, without hardship to the people, the heavy tribute exacted by Rome. The Romans, alarmed by this prosperity and by the charges of his enemies that he was plotting to renew the war against Rome, demanded Hannibal's surrender. To avoid falling into their hands, he fled to Asia, to the court of Antiochus III, at Ephesus. In the war which followed he took no important part, but when peace was concluded the surrender of Hannibal was one of the conditions. Foreseeing such a result, he fled to Bithynia, and when, several years later, the Romans hunted him out, he took poison, which, we are told, he always carried with him in a ring.

So died one of the greatest and most gifted military leaders of ancient times, an ardent patriot, a crafty strategist, and the most formidable foe that ever threatened the Roman Republic at the height of its power. (See Carthage)

Hanover, GERMANY At one time the kings of Great Britain were also German princes, ruling the kingdom (formerly electorate) of Hanover, in north-western Germany. This state of things lasted from the accession of George I, the first of the Hanoverian (or Brunswick) dynasty, in 1714, until the death of his great-

grandson, William IV—a period of over 120 years. Owing to a law forbidding female succession in Hanover, that land passed to the Duke of Cumberland, younger brother of William IV, when Queen Victoria ascended the British throne in 1837.

In the war between Prussia and Austria, in 1866, Hanover was allied with Austria, and victorious Bismarck thereupon annexed it to Prussia, of which it still remains a part. The area of this now Prussian province is 14,970 square miles, and its population about 3,367,000.

The city of Hanover (spelt in German Hanover), the capital of the province, about 60

miles south-east of Bremen, contains an irregularly built "old town," with handsome new quarters to the north and east. There are many fine parks, picture galleries and museums, and a palace with magnificent decorations. Numerous manufactures—hardware, chemicals, machinery, linen, tobacco, etc.—have contributed to the city's rapid growth in the past half-century. The population of the city is 443,000.

Hanse. In the spring of 1368 a fleet of tall-masted ships met in the Sound, off the coast of Denmark. They came from the towns of northern Germany belonging to the Hanse or Hanseatic League, which was at war with the King of Denmark.

For two years they harassed the Danish coasts and waters, sacked the Danish cities, and plundered their treasures. At the end of that

time the King of Denmark was glad to make peace, although the terms exacted were humiliating. The towns comprising the League demanded a share in the Danish revenues for 15 years, the possession of Danish strongholds, and the final voice in the selection of the Danish kings.

The Hanseatic League was the first systematic trade union known in the history of European nations, and the high political influence which it rapidly attained was due to its development of sounder principles of trade than hitherto. The foregoing episode in the history of this confederation of North German towns gives an idea of the power it then possessed. It had been growing up gradually. No one knows just when it began. More than a hundred years earlier towns had formed alliances or "hansas" to protect their traders from the plundering barons.



HANNIBAL

This great Carthaginian general was a master of the art of war, and approached the problems of battle with an ingenuity that astonished the Romans until Scipio Africanus learned to beat him at his own game.
Naples Museum photo Allart

HANNIBAL'S ELEPHANTS CROSS THE ALPS



Here stands Hannibal, with members of his staff directing the passage of the Carthaginian army over a dangerous spot, in the famous march from Spain across the Alps to Italy. Beset by hostile natives, exposed to the rigours of an Alpine winter with insufficient food, and without anything approaching modern means of transport, the task of Hannibal's army was stupendous. The success with which this seemingly impossible enterprise was carried out is still a marvel to military men.



WHEN THE HANSEATIC LEAGUE RULED BERGEN

The fine Norwegian harbour of Bergen with its shipping and fishing industries attracted the German merchants of the Hansa as an ideal port for their purposes, and from the middle of the 14th to the middle of the 16th century the League was established there and exercised an autocratic control over Norwegian trade. The illustration shows a reconstruction of the so-called German 'bridge' on the north side of the harbour. It consisted of a row of wooden houses and sheds facing the quay.

Reconstruction by R. Christensen from Schäfer: Die Deutsche Hansa, Veltkungen & Klaasing

along the highways and the routes upon the seas. These alliances proved so useful that gradually more towns joined the strongest league, of which Lubeck was the centre, and this union became known as the Hanseatic League.

When the League was at the height of its power in the 14th century it probably contained nearly 100 towns, extending from Dinant, in Belgium, to Cracow, in Poland.

Merchants of the League were exempt from the taxes and tolls levied upon others. And in some places they had a monopoly of a certain trade, as of the herring fisheries off the coast of Sweden. The League grew to be so powerful, that it not only protected its merchants, but also maintained its fleet, and even engaged in war to safeguard its interests.

But quarrels between the towns gradually weakened the influence of the League, and by 1630 most of them had deserted the alliance, although the "free cities" Hamburg, Lubeck, and Bremen, continued to be known as Hansa towns, still retaining their local self government, until the latter part of the 19th century.

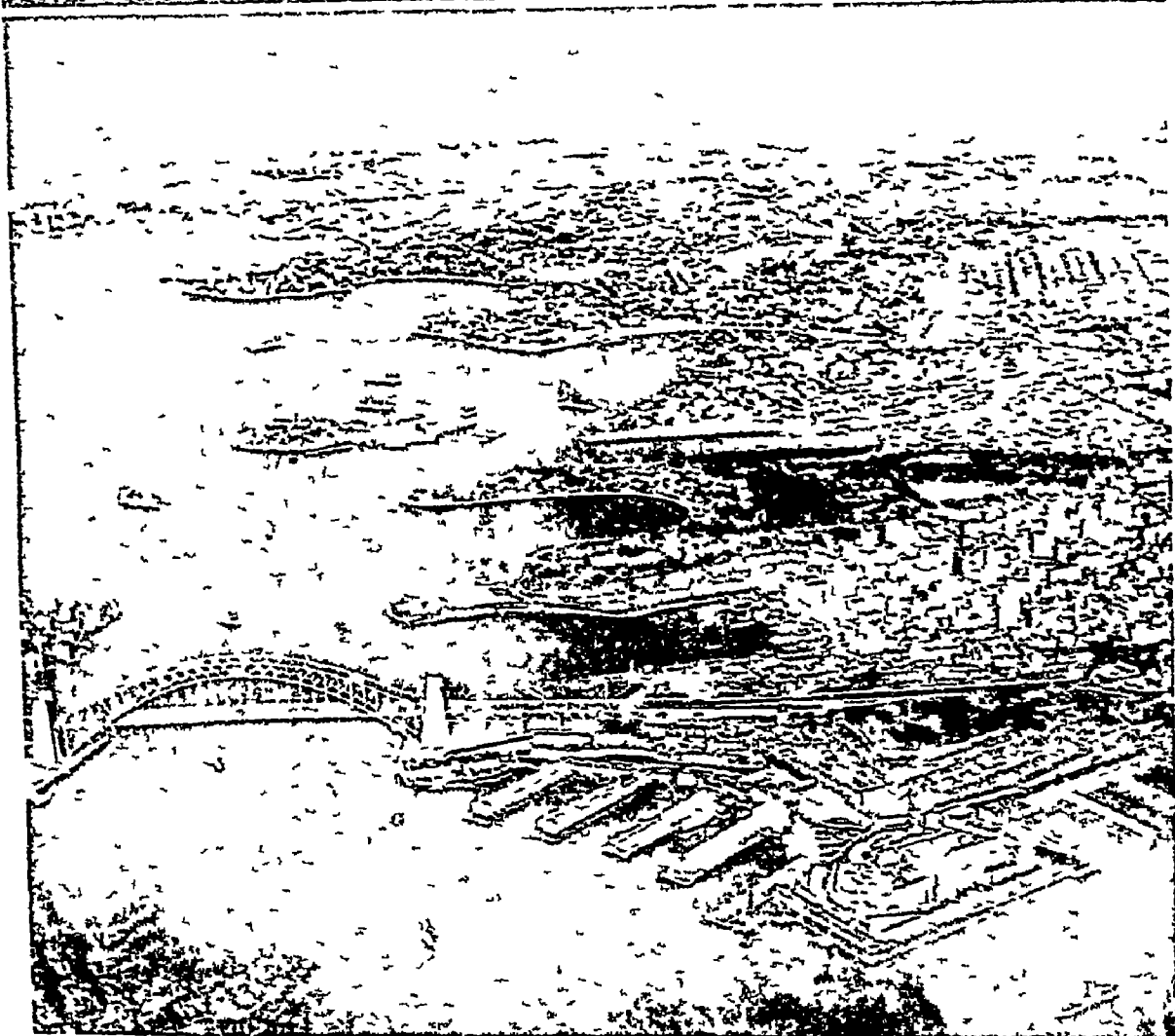
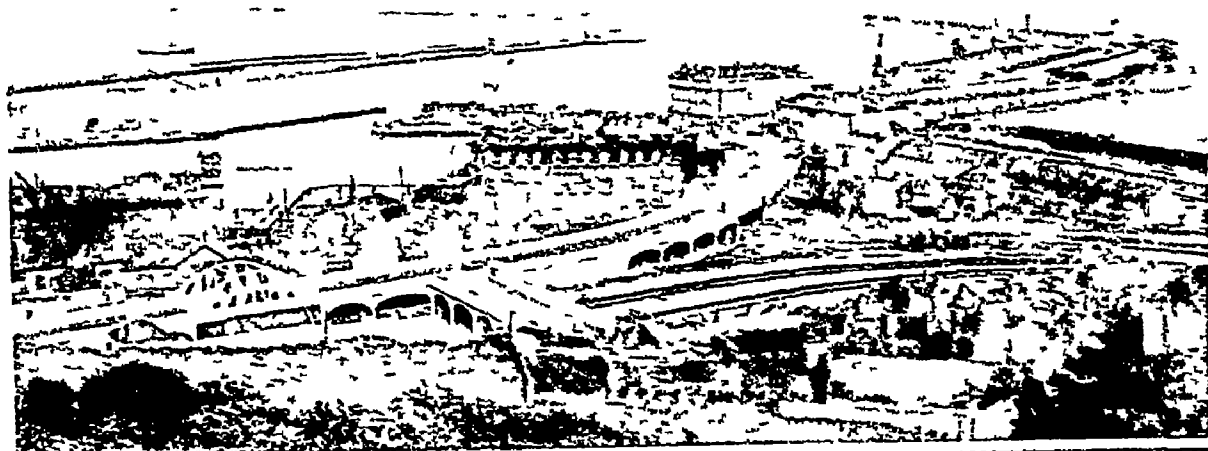
Hapsburg. On the top of the Wulpelsberg (1,682 feet high), in northern Switzerland near the junction of the little river Reuss with the Aar, stands the ruined "Hawk's Castle" (*Habichtsburg*) which was the original seat of the famous Hapsburg (or Habsburg)

family. The castle was erected in 1020, and its owners ruled Austria from 1278 to the end of the World War. With the single exception of Charles VII (1742-1745), all the rulers of the Holy Roman Empire from 1438 until the abolition of the empire in 1806, were members of the Hapsburg house. The Emperor Charles V (1519-1556) was by descent on his father's side a Hapsburg. (See Charles V, Holy Roman Emperor.) After the division of his dominions, there were two Hapsburg houses, one ruling Spain, until the extinction of the line in 1700, and the other Austria. A full lower lip and a long pointed chin—the famous "Hapsburg chin"—became family features after a marriage with a Bohemian princess in the 15th century. (See Austria Hungary.)

Harbours AND PORTS. The commercial prosperity of a nation depends almost as much on the nature of its coast line as on the trading genius of its people. For commerce, with the progress in civilization which follows on its heels, most readily springs up where there are well-sheltered harbours, in which ships may safely load and unload their cargoes.

Despite its vast potential wealth, Africa, with the exception of the narrow strip along the Mediterranean, remained undeveloped until the 19th century, largely because it has so few natural harbours. The civilization we enjoy

HARBOURS FAMED THROUGHOUT THE EMPIRE



These photographs show two of the most famous harbours in the Empire—top, Dover, the Gate of England, as it has been called, and, below, at the other end of the world, Sydney's famous land-locked harbour. The upper photograph shows the western entrance to Dover harbour, the pier used by the cross-Channel steamers is seen on the right, and the Lord Warden Hotel stands out against the waters of the harbour. The aerial view of Sydney harbour, taken by infra-red photography, shows the famous Sydney bridge in the foreground and the city stretching out beside the harbour.

Photos J. Dixon-Scott: Australia & Travel Atlas.

HARBOURS

today was born in the Mediterranean lands, where safe harbours tempted men to traverse the sea, and interchange products and ideas

Rivalry between nations for harbours has brought many terrible wars, for the state without a coast-line is at the mercy of any state whose territory it must cross to reach the ocean. The inland country battles for a strip of land along the sea, a single port, or even the establishment of a "free port" where its goods may be shipped without customs duties. The treaties that followed the 1914-18 War brought Poland a "corridor to the sea" and access to a port in the free city of Danzig, and stripped Austria of its sea-coast along the Adriatic. This land, with the ports of Trieste and Fiume, went to Italy, although Fiume was long a disputed possession between Italy and Yugoslavia.

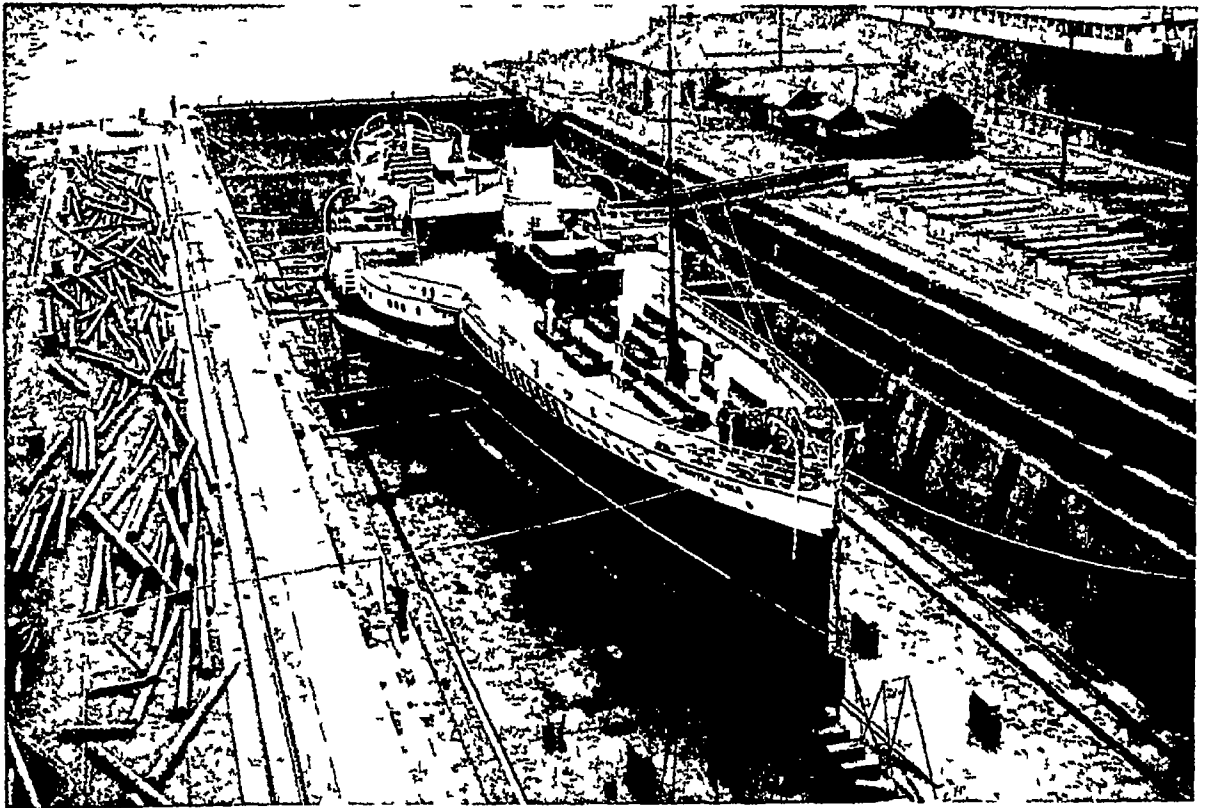
The discovery of America turned the face of Europe westward, and the excellent harbours on Europe's west coast brought wealth and power to the countries owning them. Nearly all the early centres of settlement in North and South America were at some bay or river mouth, which afforded shelter to the vessels coming to the new land.

The rapid growth of the United States and its commercial and industrial importance are due, in part, to its long strip of coast on the two great oceans, dotted with fine harbours.

Immense sums have been spent on improving natural harbours or constructing artificial ones. Tremendous breakwaters and jetties have been built far out into the sea to afford a safe refuge within. Other jetties have been built to narrow the channel and increase the scouring effect of the current, thus deepening the water in the fairway. Constant dredging is necessary in many harbours to remove the sand and silt deposited by tides and rivers. London, Liverpool, Bristol, Le Havre, and many other ports with tidal harbours have immense "wet docks," with miles of basins, to which ships are admitted by gates that retain the waters at low tide.

The profits of commerce repay the immense expense of constructing artificial harbours. Dover has one of the largest artificial harbours in the world. More than two miles of concrete breakwaters enclose a square mile of water, with a minimum depth of 40 feet.

In many cases, river channels have been dredged deeper, or canals have been built to turn inland towns into harbours large enough to receive ocean-going vessels. Perhaps the leading example is Manchester, which is connected with the ocean by the river Mersey and the famous Manchester Ship Canal, 35 miles long, allowing steamers to unload cargoes from foreign ports in its docks. The river Clyde, home of ship building, is the outstanding example whereby a



IN DRY DOCK FOR 'SPRING-CLEANING'

Every now and again ships great and small must go into dry dock so that their hulls may be repainted and examined. This photograph shows the Crested Eagle, one of the most famous of London's pleasure steamers, in dry dock at the Royal Albert Docks, London. When the dock gates, seen beyond the vessel's stern, are open she is floated into the dock, when the gates are closed the water is pumped out and the vessel comes to rest on the bottom, timber bunks preventing her from toppling over.



Photochrom

WHERE HARDY WAS BORN

This little house at Upper Bockhampton in Dorset was the birthplace of Thomas Hardy, whose novels immortalize the people of the counties of Wessex—especially of Dorset, in which he lived. Both as prose-writer and as poet, Hardy is the greatest of Wessex literary men

tortuous, shallow river, miles from the sea, has been made navigable for the largest ships afloat. Another notable instance is the port of Hamburg, 75 miles from the sea. Continuous dredging has deepened the channel of the Elbe from 15 feet to about 40 feet.

All great harbours are equipped with dry docks and other facilities for repairing ships and cleaning their hulls. A dry dock is a large basin built of concrete that can be closed with watertight gates after a vessel has entered. The water is then pumped out, the ship being held upright by timber supports.

Among harbour improvements are also included the extensive warehouses for storing freight while it awaits transportation. Even more important is the necessity for quick and easy shipments between the sea-coast and the interior of any country. This usually takes the form of railway tracks leading to the dock.

Hardy, THOMAS (1840–1928) This famous novelist (see portrait in page 1536) was born and bred near Dorchester, in Dorsetshire, and passed most of his long life in that region of woodland and heathy moor which he called by its old name “Wessex,” and which forms the setting of most of his writings.

He was educated at local schools and by private tutors, and for a time studied at King's College, London. At the age of 16 he began the study of architecture, and later he went to London as assistant to an architect. He had already begun to write, and for a time was uncertain whether to make architecture or letters his profession, but after the publication of his first really successful novel, “*Far From the Madding Crowd*,” in 1874, he decided to retire to Dorset and devote himself to writing.

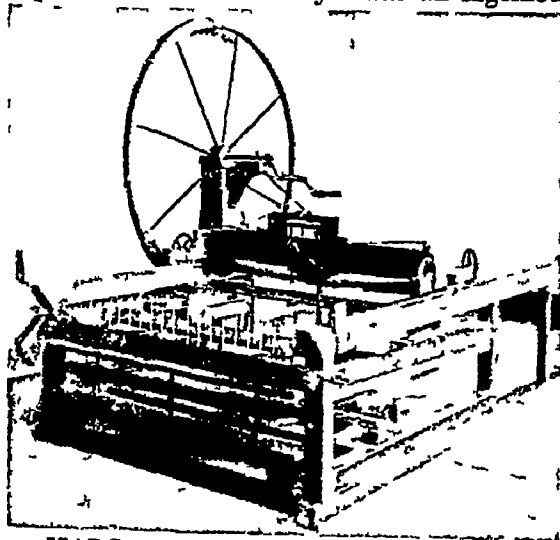
Hardy was interested in the simple primitive folk of the countryside, with their strong, elemental instincts and passions. Still more was he concerned with Nature in all its moods and changes, not merely as the great background against which he showed Man moving onward to his destiny, but also as a power which enters into the very life of Man, sometimes sympathetic, more often cruel. In “*The Return of the Native*,” for example, it is Egdon Heath, in its sombre power, that dominates the life of his characters. In his poetry, however, he is less troubled, yet always conscious of the inexorable Fate over all men and women.

Hardy was one of the few writers whose works were accepted as classics in their own lifetime, yet the intense, almost overwhelmingly sombre “*Jude the Obscure*” brought such an outcry from critics and public alike, that thereafter Hardy refused to write further novels, and devoted himself to poetry. Thus his work falls into

three periods: first, as a novelist (till 1896), then came “*The Dynasts*,” a dramatic, blank verse chronicle of England during the Napoleonic Wars, finally we have his work as a lyric poet.

Hardy's chief other novels are “*Under the Greenwood Tree*” (1872), “*The Trumpet Major*” (1880) and “*Tess of the D'Urbervilles*” (1891), one of the greatest novels in the language. His poetry includes “*Wessex Poems*” (1898) and “*Poems Past and Present*” (1901).

Hargreaves, JAMES (1730?–1778) Very little is known about the inventor of the spinning-jenny before the year 1764, beyond the fact that he was a skilled spinner and carpenter who had already made an ingenious



HARGREAVES'S 'SPINNING-JENNY'

This is the first type of ‘spinning-jenny,’ invented by James Hargreaves in 1764, enabling a number of threads to be woven at the same time to form a coarse sort of yarn. It was succeeded by the invention of Arkwright, with which you can compare it by turning to page 283.

Science Museum

"carding" machine for his own use, and that he was living in Standhill, Lancashire, where he was born, probably about 1730. Then, as now, Lancashire was the centre of England's manufacture of cotton goods, but the industry was carried on in the workmen's homes and with hand "cards," spinning-wheels, and looms.

Hargreaves' crowded cottage sheltered his family and his workshop. One of his seven children overturned his whirling wheel, a lucky accident that gave him the idea for his great invention. When the wheel was upset the spindles were vertical, and the threads flew apart as wide as the wheel's diameter. Hargreaves seized the idea and set spindles upright in a

carried it away to Nottingham, where he set up a yarn mill. His invention brought him fame but little profit, for when he applied for a patent, he was told that he had forfeited his rights by selling several of his machines. (See Arkwright, Sir Richard, Crompton, Samuel)

Harold, KING OF ENGLAND (1022?-1066) Harold II, the last king of the Anglo Saxon period, reigned for less than nine months.

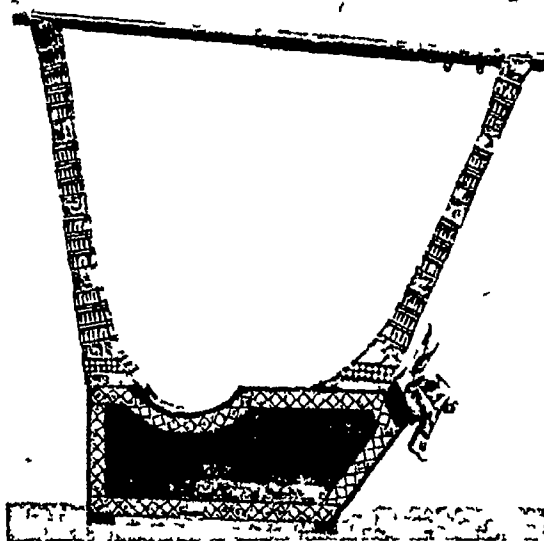
For several years before the death of Edward

the Confessor, Harold had been the chief man in the kingdom, and when in January, 1066, Edward died without direct heirs, Harold was crowned king. But William, Duke of Normandy, laid claim to the English kingship on the strength of a promise made by Edward.

When William invaded England to make good his claim, Harold was in the north, where he had been called to repel an attack by the Danes, whom he completely defeated at Stamford Bridge. Hastening south with his troops, Harold met the Norman invaders, only to fall in the battle of Hastings (qv) or Senlac, October 14, 1066.

Harp. The harp is the most ancient of stringed instruments. From primitive times men knew that a stretched bowstring gave out a pleasant, twanging sound when it was plucked. It is easy to see how some musically-inclined genius conceived the idea of adding other strings of different lengths, thus producing an instrument on which simple melodies and chords could be produced. Greek legend tells how the cithara or lyre, a harplike instrument, was invented by the precocious god Hermes (Mercury), who put strings across a tortoise's shell not long after his birth, and made

sweet music. The great antiquity of the harp is also indicated by Egyptian paintings thousands of years old, which picture the harp in various stages of development, from a form obviously derived from the hunter's bow to elaborately carved, triangular instruments much like the beautiful harp of modern days. Some of these early Egyptian harps, dating from about 1500 years before Christ, are still to be seen in the



THE HARP THROUGH THE AGES

Thousands of years after its invention, the harp still suggests the bow string from which it very likely sprang in the first instance. The uppermost of these three pictures is of a harp or lyre recovered from the dust heaps of "Ur of the Chaldees."

Beneath it are a girl harpist of ancient Egypt and (left) a player of today.

Top courtesy of Joint Expedition to Ur

frame, so that he was soon able to spin 16 threads at once. This was probably in 1764. He called his machine a "spinning-jenny," some say in honour of his wife, and others, of his daughter.

The amount of cotton yarn he began to turn out alarmed his rivals, who feared his wizard machine would leave nothing for them to do, so they broke into his house and destroyed his spinning-jenny. He built another in secret and

British Museum Much like these were the harps used by the ancient Hebrews, in their religious ceremonies, and by the ancient Irish

In the modern harp the strings are stretched between the sounding board, which rests against the player, and a gracefully curved bracket connecting the top of the sounding board with an upright pillar Through this pillar pass rods, worked by pedals at the base of the harp, by means of which the pitch of the strings is changed, so that the harp can be used in any key

If a pedal is pressed half-way down, the note is raised a semi-tone, if pressed fully down, it is raised a tone At one side of the grooves in which the pedals work, in the pedestal of the harp, are two notches into which they can be hitched when required So three different tones can be produced on every one of the about 46 strings, giving the harp a very wide range

These ingenious double action pedals—of which there are seven—were invented by Sebastien Erard (1752–1831), a French manufacturer of musical instruments, who was also distinguished for his improvements upon the piano By perfecting the harp in this and other respects, Erard greatly amplified its possibilities for orchestral use, so that now the great scores of Meyerbeer and Gounod, of Berlioz, Liszt, and Wagner, are not complete without it

Harte, FRANCIS BRET (1839–1902) When Bret Harte caught the spirit of the lawless, primitive life of the early California mining camps and put it into his vivid short stories, he did a new thing He started the American story of local colour and atmosphere, which sprang into instant popularity He knew the life he wrote about, for, though he was in New York, he had lived in California since he was 15, teaching, mining, and setting type While he was at work in a San Francisco newspaper

office, he wrote the first of his sketches and was at once promoted to the editorial staff He became editor of the "Overland Monthly," in 1868, and contributed to it "The Luck of Roaring Camp" (1868) and "The Outcasts of Poker Flats" (1869), the most famous of his stories of rough western life Harte had a talent, too, for humorous verse, and the world laughed at his "Heathen Chinee" (1870), the Chinaman with the "smile that was childlike and bland," who turned the tables on two white men who tried to cheat him at cards "Which is why I remark, and my language is plain



BRET HARTE

This American writer is generally regarded as one of the greatest masters of the short story

—so Truthful James, who tells the story—"that for ways that are dark and for tricks that are vain, the Heathen Chinee is peculiar"

Bret Harte's fame had spread so far, meanwhile, that the "Atlantic Monthly" asked him to write for it alone He went east in 1870, lectured awhile on California life, then was sent as consul to Crefeld in Germany, and later to Glasgow, Scotland His last years, after 1885, were spent in England, where he died He was the author of many other short stories and one long novel

Harvest. With the coming of August, the thoughts of all who live in the country turn to the harvesting of the corn Some kind of crop is being harvested in almost every month of the year, but it is as August merges into September that



HARVEST CORN FOR THE BIRDS

Harvest time sees the revival of many an ancient practice. Thus here we see the rector of Ackworth, near Pontefract, hanging a sheaf of corn on St. Cuthbert's staff, just as, more than a thousand years ago, the Norsemen hung out corn for the ravens of Odin

HARVEST



PREPARING FOR THE HARVEST FESTIVAL

There are ceremonies connected with the gathering of the harvest that are of immemorial antiquity and world-wide distribution. Some of them date back to pagan times, and some have a Christian significance. Here is a scene in a Rumanian harvest field, where the reaping is still done with scythe and sickle and the crop is carried home in a wagon drawn by oxen. The reapers are making with the wheat a double cross, to be carried in the harvest festival. Such crosses are completed by binding them together with broad striped ribbon.

the farmer and his assistants have their busiest season. The word corn is a general term, and is applied to practically all kinds of grain. It may mean wheat, oats or barley, and is generally used to denote the kind of grain (or cereal as it is called) most widely grown in the district.

Among the chief cereals, barley is allowed to remain standing until the grains are fully ripe and the ears bend down, while oats and wheat are cut before fully mature, as otherwise the grain is liable to fall out and be lost. The sickle for reaping, and hand labour for making up the sheaves, are now almost entirely superseded by

the reaping machine and self-binder. Carts may be filled up by means of a mechanical loader, and the labour of stack-building reduced by employment of an elevator. When stacks are built in the open the principles of construction and thatching are similar to those used for hay. It is usual to raise a corn stack from the ground as a prevention against rats and mice.

Ceremonies and celebrations associated with the gathering in of the harvest are of immemorial antiquity. They originated in worship of the Nature deities associated with the growth of crops. Among the Romans, the Cerealia were

feasts in honour of Ceres, and many widely disseminated customs are linked with the classical legends of Demeter and Persephone

One custom which, with but slight variations, can be traced among widely separated peoples, is the forming of a crude figure—sometimes merely a handful of corn decorated—which is borne in procession as a personification of the crop, and made the central figure of the festivities. This custom still survives in parts of England, Ireland, and Scotland, where a harvest doll or kern, i. e., corn baby, is fashioned from some of the last corn into the semblance of a human figure, dressed up, and carried with the last wagon-load of the harvest

In Scotland, the last sheaf, called the Maiden or the Old Woman, according to whether it is cut before or after Hallowe'en, is kept till Christmas morning, when it is distributed to the cattle to give them health throughout the next year, or is hung up until replaced by its next year's successor. Similar customs are recorded in various European countries, and are believed to be relics of the far distant times when human beings were sacrificed to make the crops grow

Another immemorial custom is the harvest supper, given by the owner of the crop to all who help to garner it. The Jews feasted at the getting-in of harvest and made a thank-offering of the first fruits, and among the heathen



HARVEY, PIONEER PHYSICIAN

In the list of great doctors William Harvey holds a high place, for it was he who discovered the fact that the blood in our bodies moves with a regular flow. Above we see him as painted by his Dutch contemporary, Cornelius Janssen.
Royal College of Physicians

peoples the heads of families feasted on terms of equality with their servants. In England, the supper was the crowning celebration of the "harvest home," and from the fact that a goose was the principal dish on these occasions the custom of eating a goose on Michaelmas Day originated. In Scotland, too, the "kern supper," upon the completion of the harvest, is an important social event in the farmer's life. In these feasts, as in many more primitive customs, it is easy to see a reflection of the farmer's joy that his labours have been rewarded

Harvey, WILLIAM (1578-1657) You very probably know that your heart is a pump which sends your blood constantly circulating through your arteries and veins. Yet though for centuries it had been realized that blood circulates throughout the body it was believed that this movement was haphazard, and it was not until the year 1616 that William Harvey, Lumleian Professor to the Royal College of Physicians, announced to the world his discovery of the organized circulation of the blood, via arteries, arterioles, venules, and veins, by the regular pulsations of the heart. He pointed out that the small size of the heart made it impossible that it could be anything but the same blood that goes and returns. His discovery opened up a new field of research into nutrition and the chemistry of the blood, proving as it did that the blood is the vehicle by which all food eventually reaches the tissues

Harvey was born at Folkestone on April 1, 1578, and was educated at Canterbury and Caius College, Cambridge. He afterwards studied at Padua, but returned to London in 1602. He became a fellow of the College of Physicians in 1607, and was appointed physician to St Bartholomew's Hospital in 1609. During the distracted years of the Civil War he occupied himself with his scientific studies and wrote important works on the subjects of generation and respiration.

He was distrusted by many fellow physicians after his discovery, but he lived to see it fully recognized. Harvey is buried at Hempstead, in Essex, and there is a statue of him on the Leas, at Folkestone.

Harz Mountains, (Pron harts), GERMANY Quaint old towns, ruined castles, and fantastic rock masses, rich with the romance of many centuries, abound in the deep, wooded valleys of the beautiful Harz Mountains. These mountains lie in west-central Germany, between the rivers Elbe and Weser, extend 57 miles to the north-west, and average about 20 miles in width.

The upper slopes are bare of trees, but grazing is plentiful. The lower slopes support forests of pine and fir.

The highest elevation is the Brocken, a mammoth, dome shaped mass of granite, 3,745 feet high—the highest peak in Central Germany.



KING HAROLD KILLED AT THE BATTLE OF HASTINGS

The famous Bayeux Tapestry (*qv*) gives an interesting contemporary idea of the Battle of Hastings. This was fought on October 14, 1066, between King Harold's men of England and the Norman army, reinforced by Bretons and other French warriors, under Duke William. Above is a representation of the climax of the battle—Harold, leading his men on a charger, is struck down and killed by a Norman arrow. The tide of battle turned against the English when William, feigning retreat, drew the defenders from their safe hill-top position.

Many legends have sprung up about the Brocken, and there are still strange ceremonies on the summit on Walpurgis Night (May 1). The climate on the mountain tops is damp and cold, but in summer the temperature of the valleys is delightfully cool and pleasant, making the region a favourite touring ground.

The richest stores of minerals in all Germany lie in these mountains, making mining the chief industry. Veins of lead with a mixture of silver abound, and gold, copper, iron, and sulphur are also found.

Hastings, BATTLE OF (1066) The battle commonly called the Battle of Hastings was actually fought at Senlac, about six miles away. Duke William of Normandy, who claimed the throne of England against King Harold, succeeded in landing his army without active opposition at Pevensey Bay, on the English Channel. At dawn on October 14, 1066, he roused his troops and set out on an eight-mile march to attack the English, who had occupied the crest of a steep hill.

The English were about as numerous as the Normans, and were packed closely together on foot, protected by their great shields. They repulsed attack after attack of the mounted Normans, hurling darts and lances, and using long-handled battle-axes with terrible effect.

Towards evening Harold was struck by an arrow and fell mortally wounded. His two brothers were already slain, and the picked troops who guarded the dragon standard of Wessex were killed. The rest then fled, and victory remained with the Normans.

Hastings, which gave its name to the battle, is a thriving Sussex town and seaside resort, with a population of about 65,000.

Hastings, WARREN (1732–1818) Clive may have laid the foundations of the British power in India, but it was his successor, Warren Hastings, who built on those foundations in such a way as to produce the Indian Empire.

When Suraj-ud-Dowlah marched on Calcutta and committed the Black Hole crime (*see* Clive, Robert), Hastings was at a cotton factory near

HASTINGS

Calcutta, and for a time was held prisoner Clive marched against the Indian prince, and Hastings joined his force as a volunteer, to help in the recovery of Calcutta Clive recognized his abilities, and made him agent of the East India Company at the court of a native prince

After 14 years in India, Hastings returned to England in 1764 In 1772—following Clive's retirement and the most terrible famine in India's history—Hastings was appointed Governor of the province of Bengal, and later was made Governor-General for the Company

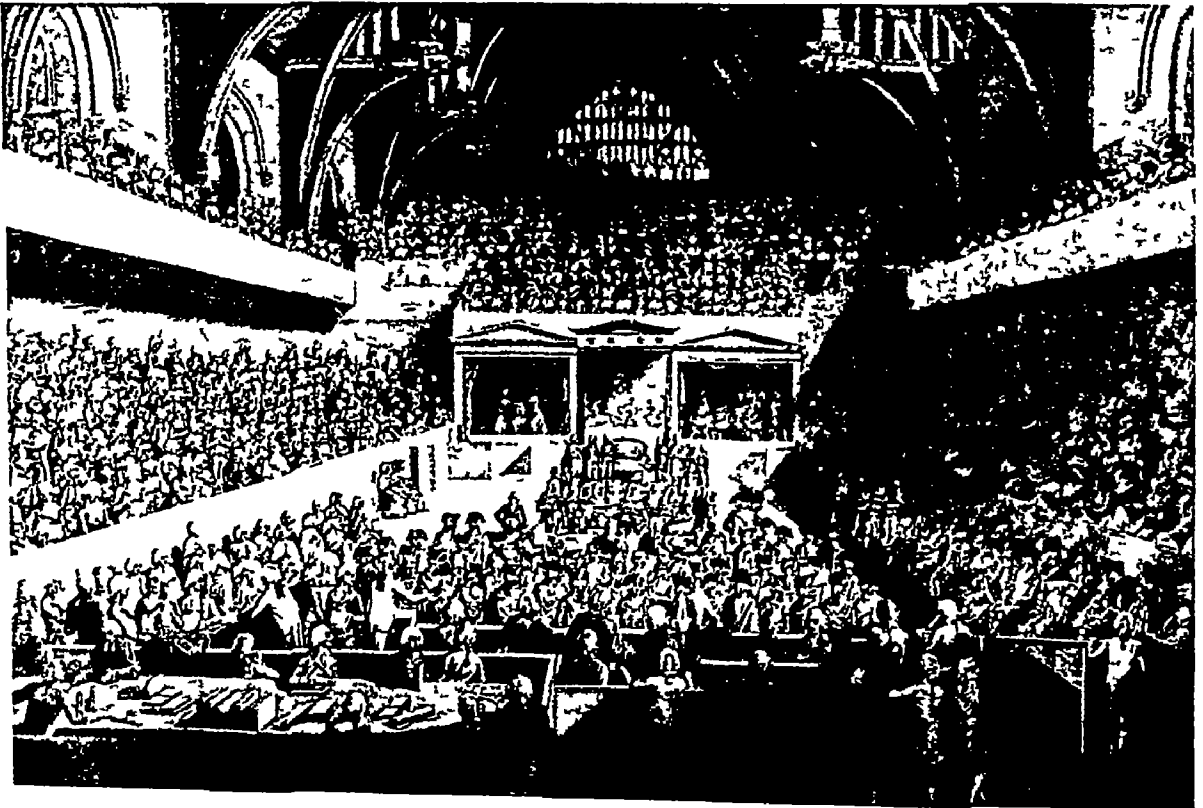
His administration, which lasted until 1785, marks a great epoch in the extension of British rule In the beginning, the East India Company was merely a trading corporation, having nothing to do with governing the land outside its own trading posts Now it took over, in addition, the chief work of government in wide stretches of the land—collecting the taxes and maintaining armies, and leaving to the native rulers of those provinces only shadowy power Elsewhere, also, the Company undertook to furnish the princes with military protection, in return for large money payments

Hastings had to watch the interests of the Company, and wage wars for the protection of

their territories Meanwhile the French were plotting in the south with powerful Indian princes Hastings found difficulty in finding money for these various wars, for many of the princes had failed to pay the sums due for their protection

Hastings accordingly forced the Rajah of Benares to pay up, and also collected arrears from a weak prince in Oudh, who claimed that his mother the Begum (queen) held all his money These two debts collected, Hastings had money enough for the war in the rich plains near Madras, where Hyder Ali with a huge army was laying waste the land After defeating two British generals, Hyder Ali was routed by General Coote, and his French allies were driven from the sea by a British fleet

Hastings retired in 1785, after completing Clive's great work His measures in India had created for him a host of enemies Chief of these was Philip Francis, a member of his Council, whom he had wounded in a duel at Calcutta At home the orator Burke and the playwright Sheridan took the lead in demanding Hastings' impeachment by Parliament For seven years the trial dragged on, and although it ended in his acquittal the great expense made him a poor man He died in 1818



WARREN HASTINGS STANDS HIS TRIAL

In January 1785 Warren Hastings returned to England after having established British dominion in India, but certain incidents in his administration provoked adverse criticism, and he was impeached by the Commons and stood his trial before the House of Lords This illustration shows the opening scene in Westminster Hall on February 13, 1788 The trial dragged on for seven years, and before Hastings was acquitted the public lost interest in the case. Among the managers for the Commons on the opening day were Burke, Fox and Sheridan Before the trial had ended many of those who saw the beginning were no longer alive

After a drawing by G E Doyes

A GLANCE *at the* WORLD'S HAT-RACK

This is an unusual but interesting subject—the making and wearing of hats and caps the world over Even in this open-air age the majority of us cover our heads at some time or other

Hats AND CAPS There are almost as many different kinds of hats as there are of heads to wear them, and if we could collect specimens of



the head-gear of every land and age on one gigantic hat-rack, what an amusing and interesting sight it would make! The fur hood of the Eskimo would hang beside the Mexican's high-peaked hat, and between the glossy silk hat of civilization and the huge, umbrella-like straw hat of the Burmese would hang the turban of the Mahomedan, and the beribboned bonnet of the Scottish Highlander

The cone-shaped hats of the early Aegean civilization—4,000 years ago—and the tall, cylinder-shaped head-gear of the Hittite kings and queens would present a fascinating contrast to the cocked hat of the 18th century, and the hat that is worn by the cowboy of the western plains of America

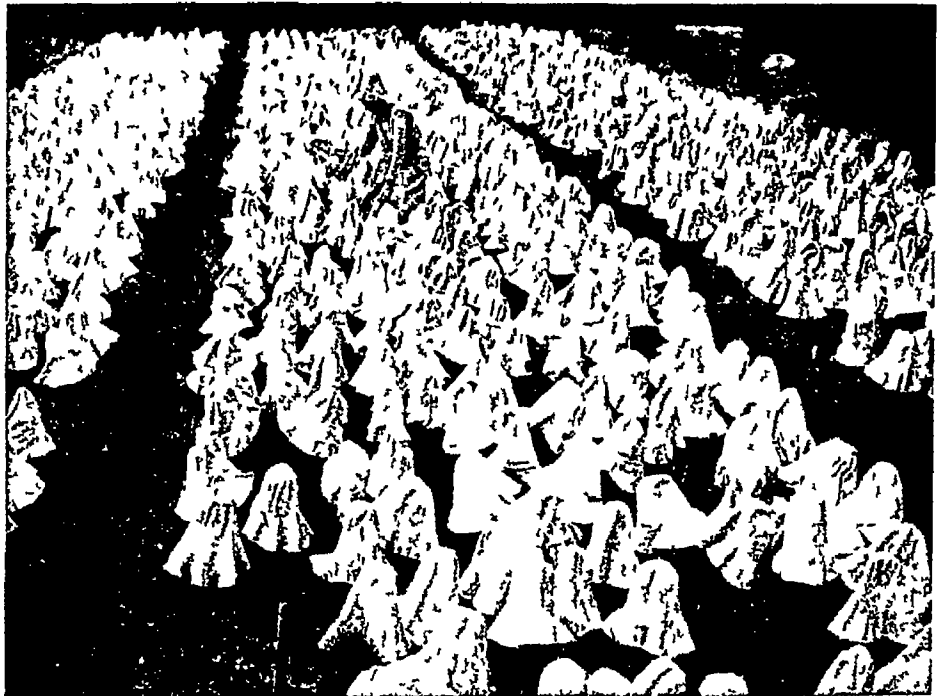
Why such a marvellous variety of forms? Partly to serve particular needs, partly just for ornament In regions of great heat or intense cold, protection is the first purpose of head covering, but in the civilized countries of the temperate zone, where it is rarely excessively hot, cold, or wet, hats vary greatly in shape, size, and material

Bright colours are common, hats are designed, to a great extent, for decoration, and fashion determines the materials These materials are gathered from all over the world

—straw from the Philippines, Italy, and Japan, rabbit fur, for felt, from Australia and Central Europe, silk from China, Italy, and Japan Countries where there is little foreign commerce must use materials close at hand, and head-dress once adopted is used for centuries

If ever you get the chance, visit one of our great felt-hat factories, and see how a "trilby" or "pork-pie" is made from a few scraps of fur, from an animal that once scampered over the plains of Australia, Argentina, or Canada For the finer grades, fur alone is used, but cheaper hats are made from a mixture of wool and fur, or wool alone The first step is to clean and brush the fur while it is still on the skin, and "carrot" it, by brushing on nitrate of mercury, to make it felt more easily Then a machine shears off the fur, which passes on an endless belt to blowing machines In these, the soft fluff is torn apart by steel teeth, and freed from hairs or foreign material

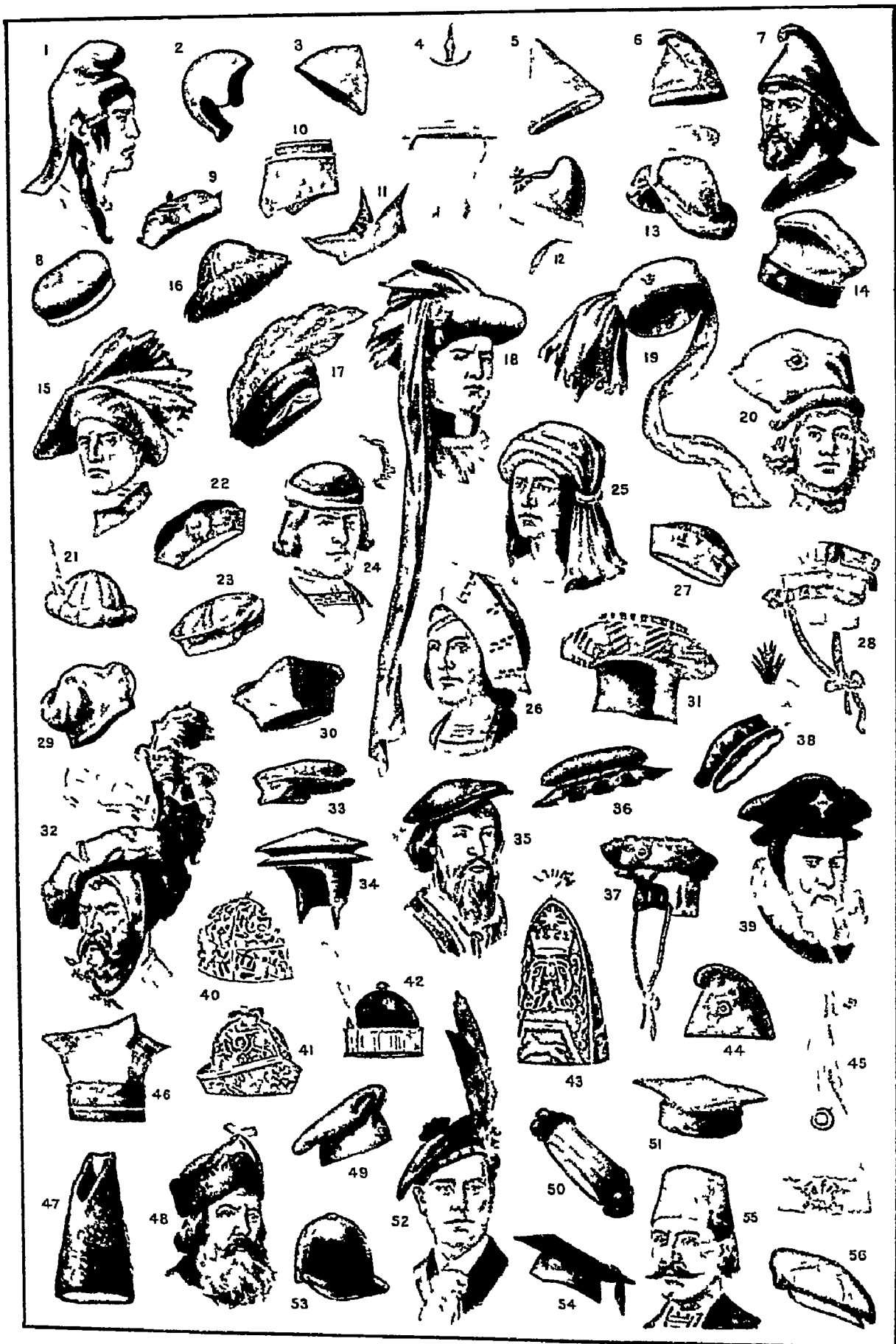
Now begins the transformation into a hat The exact amount of fur needed to make one hat is passed to a boxed-in machine, which contains a minutely perforated copper cone, about three feet high As this cone revolves,



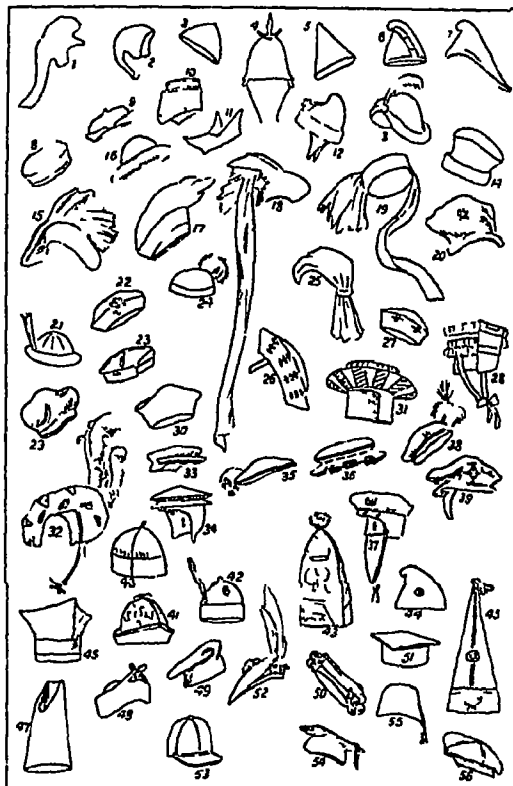
'PANAMA' HATS MADE IN ENGLAND

The light and flexible Panama hats that are worn in hot summers are made of the young leaf of a palm that grows in Central and South America, chiefly in Colombia and Ecuador and, formerly were exclusively made there The leaf is now, however, imported to Europe, and the photograph shows a part of the huge bleaching field of a Panama hat factory at Luton, Bedfordshire

HATS & CAPS OF MANY LANDS AND AGES



HEADGEAR THROUGH THE AGES



- 1, Phrygian 2, Ancient Egyptian skull-cap 3, Ancient Greek felt cap 4, Cap of priest in Ancient Rome 5 and 6, Anglo-Saxon 7, 8, and 9, Anglo-Norman 10, Spanish, 13th century 11, English, c. 1300 12, Cap of Doge of Venice, c. 1300 13, English, 14th cent 14, Italian c. 1400 15 and 16, English, c. 1400 17 and 18, French, c. 1400 19 Roundlet, 15th cent 20, Jewelled bag cap, 15th cent. 21, 22, and 23, Middle 15th cent 24, English, late 15th cent 25, Burgundian, 1456 26, 27, and 28, Late 15th cent 29, Cardinal's, c. 1500 30, Bishop's, c. 1500 31, French, 16th cent 32, Milanese, 16th cent 33, 34, and 35, English flat caps, 16th cent 36, Middle 16th cent 37, German, c. 1550 38, Cap of Knight of Garter, 16th cent 39, English, 16th cent 40 and 41, Indoor caps, 17th and 18th cent. 42, Running footman's cap, early 18th cent 43, Grenadier cap, middle 18th cent 44, French Cap of Liberty, late 18th cent. 45, Jacobin cap, worn doubled over 46, Laplander's 47, Persian 48, Russian 49 and 50, Spanish 51, Polish 52, Highland Chief's 53, Huntsman's 54, College cap 55, Fez 56, Tweed cap, 20th cent

HATS & CAPS

myriads of the mist-like fur particles are drawn by suction to its damp outer side, forming a thin covering of felt. A wet cloth is thrown over this matted fur, another cone is pressed over it, and the whole is placed in a tank of hot water, until it felts under the pressure.



ANCIENT HAT BAND

The old Egyptians wore a band to keep their hair in place. We have kept the band, but put it on the outside of our hats.

hot water, steam, and ingenious machinery, until it has taken the desired form.

Stiff hats are put in a hydraulic press to increase their rigidity and the brim is curled by being pressed on a flange by a bag of hot sand. The rough surface is smoothed by rubbing with emery paper, the trimming is put on, and, last of all, the leather band is attached inside—and the hat is ready for the wearer.

Straw hats ("boaters")—a less common head gear among Englishmen since the years immediately after the War—are made from carefully prepared imported straw. The braids, except in some of the finer grades, are sewn and pressed into shape by machinery, after being sized with waterproof gum. Panama hats are made from a very fine light "straw" (*toquilla*) obtained from the leaves of a shrub that grows in South America, chiefly in Ecuador, though it is also found in Colombia and the forests of the upper Amazon. The best hats take five or six months to complete, since the fibres must be kept thoroughly moistened, and the weaving is done only in the cool of the late twilight or early dawn.

In the manufacture of silk hats, now chiefly used for ceremonial occasions, several layers of cotton material are cemented together with shellac. This "body" is pressed into shape on a block, and the rim is cemented to it. Then it is coated with shellac, covered with silk plush, trimmed and finished. The manufacture of hats and caps is an important industry in England, the felt hat industry centring around Manchester, and straw hats being made at Luton.

The manufacture of women's hats is not so centralized, and many of the felt hats are made

at the same factory where men's hats are manufactured. Some women's hats are made by covering shapes of buckram with various fabrics, the variety in design, colouring and ornament being endless.

Did you ever notice the tiny bow that decorates the lining or inner band of most hats, both men's and women's? Not so very long ago hats were made in only a few sizes, and a draw string was inserted in the lining, which was tightened or loosened to fit the head. The little bow is a relic of that old practice, but now it only serves to mark the back of the hat.

The ancient Greeks, when travelling, protected their heads with a flat, broad-brimmed hat of felt which, tied with strings under the chin, hung down the back when not needed, like a sun-bonnet of today. These tie strings are still preserved in the streamers round the crown of a child's sailor hat.



THE STREAMERS

Streamers on hats are reminders of the tie-strings on the ancient Greek travelling hats.

During the 14th and 15th centuries women's hats, caps, and hoods were of the most extravagant shapes and sizes. Some were horned, others were great cones, like the "dunce-cap," from one foot to three feet in height. Sometimes a veil would be draped over these towering structures, falling the length of the dress.

Hats have often had an important place in distinguishing sects and parties. The Puritan wore his severe, high-crowned hat over his cropped head as a rebuke to the cavalier of the time, with his hair in curls, and a great sweeping plume on his low crowned hat. The Quaker affected a broad-brimmed, grey hat, which he refused to doff to any man—only to his Maker. In the Roman Catholic and Anglican Churches, hats and other forms of head gear have a prominent place in distinguishing the vestments of various ranks and orders of the clergy.

During the greater part of the 18th century two rival political parties in Sweden, known as "Hats" and "Caps," were in constant struggle, the "Hats" representing the nobles, and the "Caps" the common people.

In the House of Commons, members may wear their hats while seated, but take them off when they rise to speak. But in one special case—after a debate has been closed and a vote ordered, but before it is actually taken—a member who wishes to raise a point of order must speak seated, and with his hat on. The great Gladstone once ran foul of

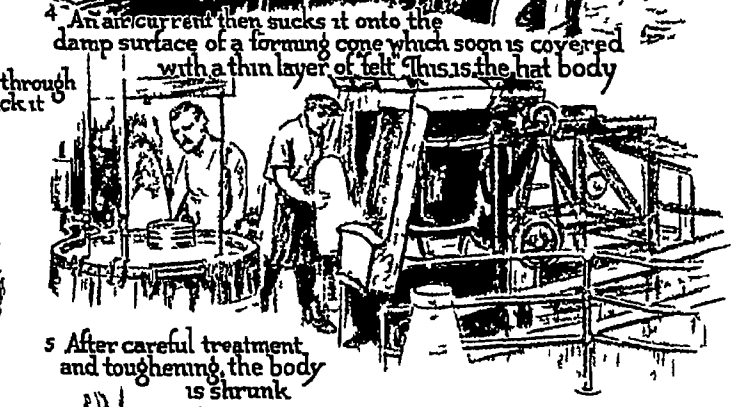
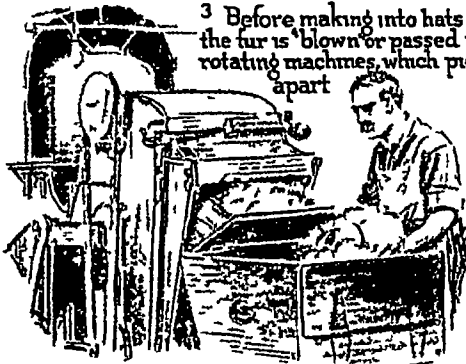
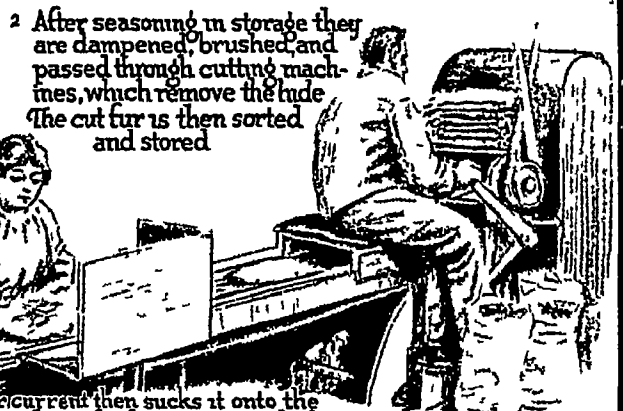


THE LITTLE BOW

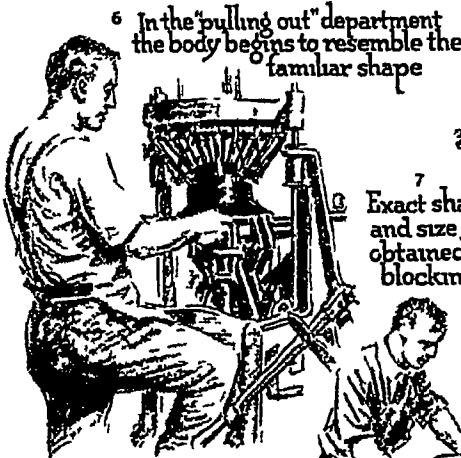
The little bows inside men's hat bands are relics of the draw-string used in olden days to make hats fit.



ELEVEN STEPS IN THE MAKING OF MEN'S HATS



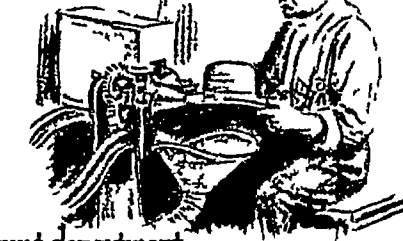
5 After careful treatment and toughening, the body is shrunk.



10 The hat is then placed in a wooden form and the brim, cut to the right width, is flanged or curled under a huge bag of heated sand.



11 In the trimming department the hat is completed, and after one more flanging it is ready to pack and ship.



The pictures tell the story of a man's felt hat from the raw fur to the finished product.

this custom He had wandered away from his seat bare headed, and wished to speak "Hat! hat! hat!" cried members as he started to speak A near by member lent him a hat, but it was several sizes too small for him With this perched ridiculously on his massive head, the "Grand Old Man" was allowed to proceed This incident illustrates only one of many points of etiquette, regarding the hat, in the House of Commons



Formerly inferiors were required to uncover in the presence of superiors Today this custom survives chiefly in the custom of removing the hat in the presence of royalty, and other distinguished persons, and of raising it to ladies out of doors

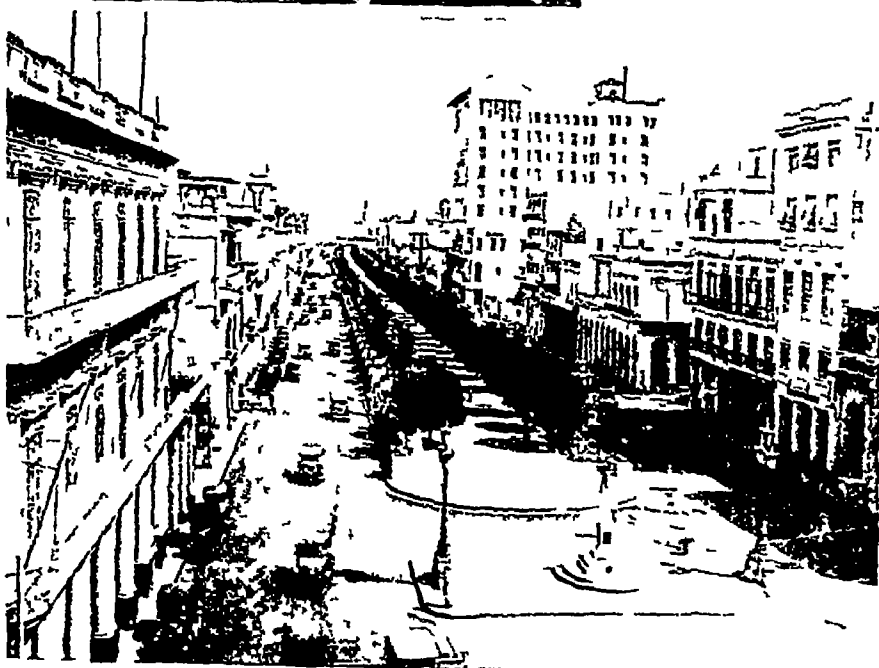
Havana, CUBA

A blazing tropical sun beating down upon narrow white pavements, sparkling on marble palaces and gay coloured Spanish houses, lighting up modern office buildings and old grey churches, scorching the concrete docks and forests of masts along the water front, and brightening the

surrounding amphitheatre of palm-fringed hills such is the traveller's impression of Havana, the capital of Cuba

It is, on the one hand, a quaint city of plazas, bazaars, cafés, and tobacco, and wine-shops a city where the boom of ancient cathedral bells mingles with the clang of cart bells and the cries of street venders, as they press their way in and out of old market-places piled high with tropical fruit, vegetables, and many-coloured fish, and wander down cobbled lanes here and there topped with canvas canopies, and edged everywhere by one-storey plaster-faced houses, with balconies, flat roofs, jutting, iron-barred windows, and arched doors leading to dim patios or open courtyards, which are so familiar a feature of Spanish or Spanish-American dwellings

On the other hand, Havana is curiously modern, with a distinct American flavour Motor cars, which are for hire everywhere, compete with clanging tram cars in mad rushes up and down the narrow old streets



IN THE SPACIOUS CITY OF HAVANA

Havana is the largest and one of the most progressive cities in the West Indies and large sums have been spent in erecting modern buildings, white coral limestone being the material chiefly used The photograph above shows the Paseo de Martí, or Prado, one of the chief residential and business streets of the city In the Prado stands Havana's Capitol, the home of the legislature seen in the upper photograph

HAVANA

The uniform of the Cuban soldier is American, so too are the posters and electric signs

At all points there is thus a curious dovetailing of the old and the new Office buildings, theatres, hotels, and clubs jostle crumbled Spanish churches, the latest factory products are found in the quaint old-time markets, modern ferries steam across the harbour, past queer old row-boats with awnings at the rear, old convents have been transformed into post-offices, warehouses, and customs offices

The largest and most important commercial city in the West Indies, Havana possesses busy factories, banks, and stores of all description Its railways shoot out to every important island centre At its doors is one of the safest harbours in the world, where 4,000 ships enter every year, flying flags of many nations, and laden with all kinds of cargoes Havana possesses some of the largest cigar and tobacco factories in the world, although she makes other things, too, such as boxes, barrels, wagons, and carriages

The city is famous for its promenades, edged by mansions of the well-to-do planters, for its public gardens, university, and its drives—such as the beautiful Prado, with its double row of laurels and other shade trees, and graceful palms running along the middle, for its old cathedral dating back to 1724, where until 1898 the body

HAVRE

of Christopher Columbus lay buried, for the picturesque old forts of Morro Castle, La Cabana, and Punto Castle, that guard the entrance to its harbour, for the new domed Capitol, and for the seaside resorts near by

Dates in Havana's History

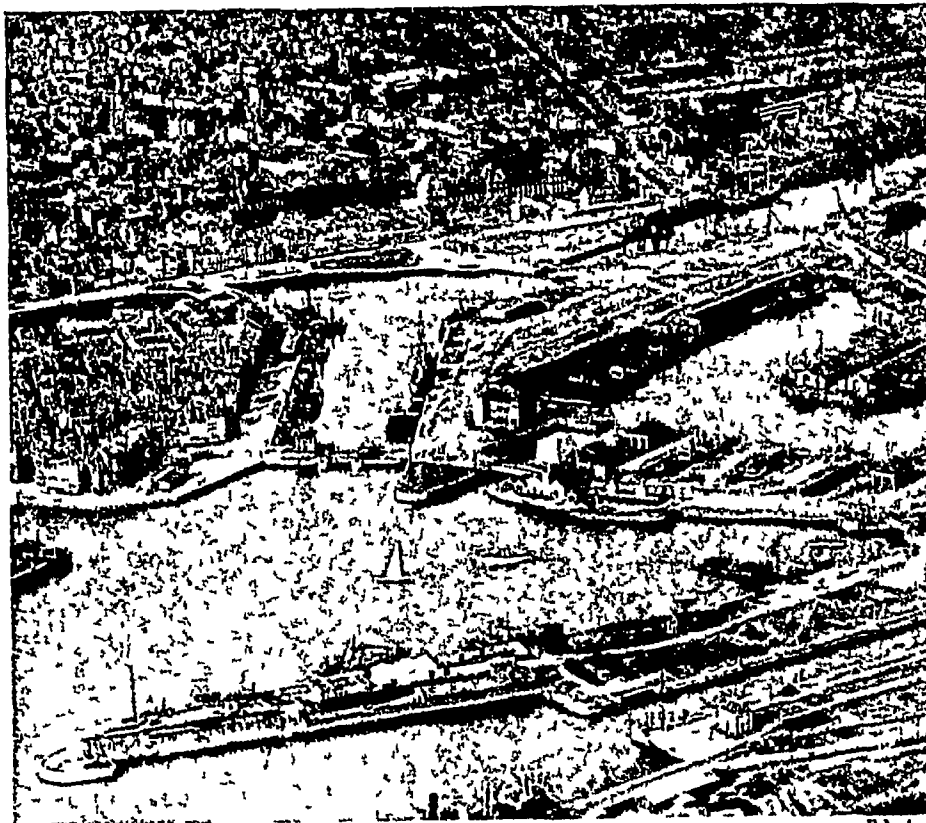
Havana is situated on the north coast of Cuba between the Gulf of Mexico and the land-locked harbour It was founded in 1515 and removed to its present site in 1519 It was the chief city of the Spanish power in the West Indies till near the end of the 19th century In February, 1898, the United States battleship Maine was blown up in its harbour, and during the Spanish-American War that followed the city was blockaded by the United States fleet With the end of Spanish rule, Havana became the capital of the new republic Population, about 552,000

Havre, (Pron ah'-vr), FRANCE To the inexperienced traveller, towns, like people, have personalities Some are interesting, and full of romance and colour, some are just good work-a-day places, but not very interesting Havre, which the French people call Le Havre ("the Harbour"), is such a work-a-day town

But it is an important town, for its situation at the mouth of the River Seine makes it one of the chief seaports of France Many big steamers enter the harbour every year—nearly

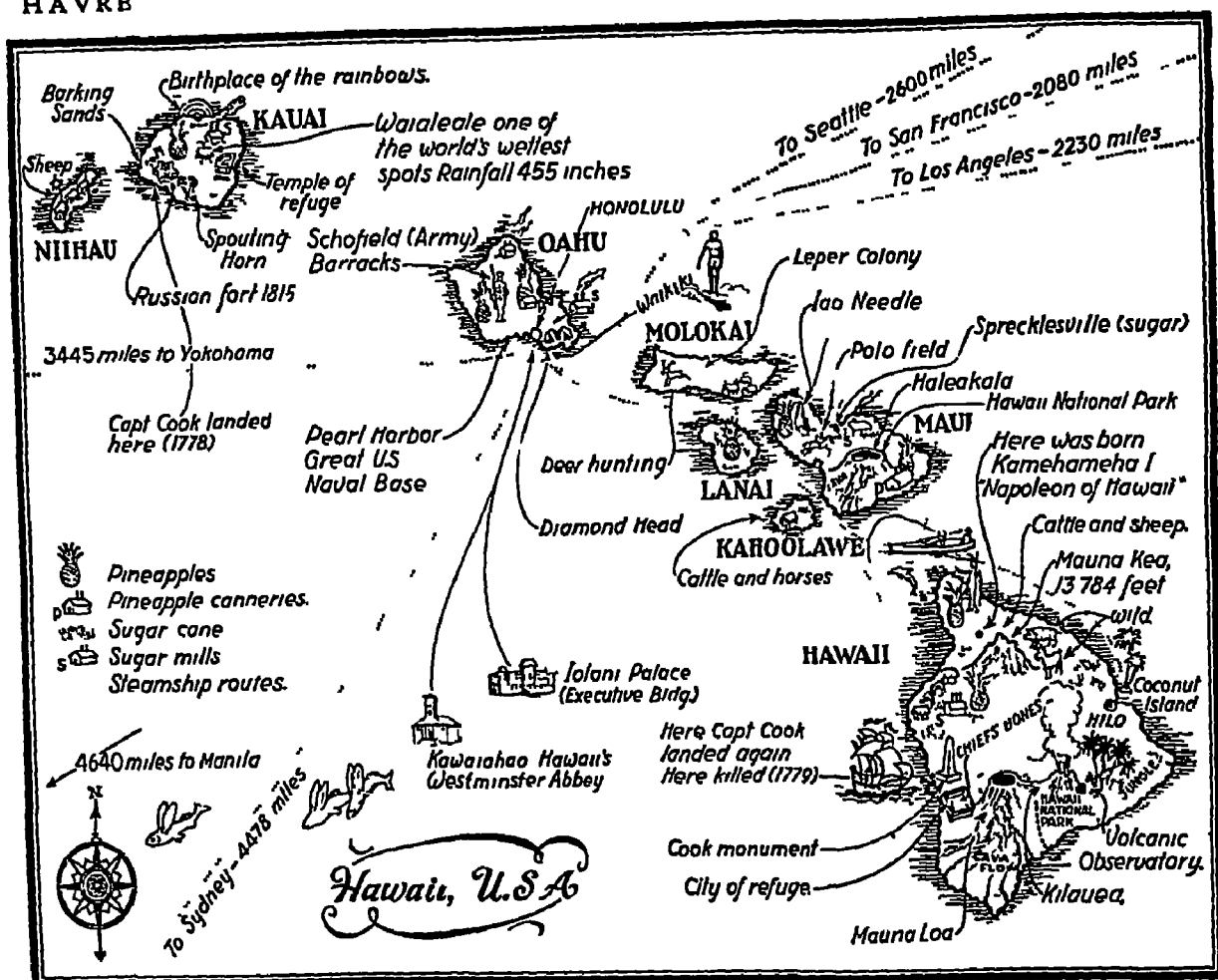
6,000 ships were registered during 1930—while there is a regular steamer service between Havre and Southampton The town has nine immense harbour basins, with eight miles of quay, lined with warehouses It is very prosperous, largely because of its shipbuilding yards, its sugar refineries, and its trade in cotton, silk and woollens

Havre is quite a new town, that is to say, as French towns go It gained its first importance in 1516, under Francis I, who fortified it for use as a naval base, in his wars against England During the World War Havre was a base of the British Expeditionary Force, and from October



HAVRE SEEN FROM THE AIR

This great French port lies on the northern bank of the Seine estuary, and the tonnage of ships using it exceeds that for Cherbourg and is second only to that for Marseilles It is a port of call for ocean liners, and there is a cross-Channel passenger service to Southampton Besides its importance as a port Havre has large chemical and engineering works



THINGS WORTH KNOWING ABOUT THE ISLANDS OF HAWAII

This graphic map tells of important products in the Hawaiian Islands, of their distance from various cities, of events in Hawaiian history, and of interesting geographical details. Note the native temples and monuments.

1914 to November, 1918, it was the seat of the Belgian Government.

After the World War a vast plan for harbour development was undertaken, including the building of a gigantic breakwater across the entrance channel, to form a new great outer harbour, and to serve also as point of arrival and departure for seaplanes. Enormous new ware houses were built. A large basin was constructed in the outer harbour to accommodate the petroleum trade, and huge storage tanks were provided. The channel entrance of Havre is 13,120 feet long, 820 feet wide, and approximately 30 feet deep. The outer port has a surface of almost 198 acres. There are 11 wet docks, with a total quay length of over 11 miles.

The chief imports are cotton, coffee, lumber, oil, hides, grain, rum, sugar, oil seeds, rubber, coal, metals, and spices. The exports are mostly luxury goods. Population, about 165,000.

Hawaiian Islands. (Pron hah-wi'-yan) In the centre of the Pacific Ocean, 2,000 miles away from any important land area, are the Hawaiian Islands. They are really the tops of 15 or more enormous volcanoes which have

been built up from the bottom of the ocean. Hawaii, the largest and most southerly island, consists of five volcanic mountains, which have encroached upon one another by their eruptions.

Several islands, like Maui, consist of "volcanic twins" united at the base, while others are built round a single cone. There are now no active volcanoes, except on Hawaii, but all the islands are mountainous, in many places rising from the sea in sheer cliffs hundreds and even thousands of feet in height.

Nowhere will you find a more healthful and delightful climate than in this Paradise of the Pacific. Cooled in summer and warmed in winter by the ocean winds, it is seldom too hot and never cold, and the temperature is about ten degrees lower than in other lands of the same latitude. Owing to the north east trade winds, the islands are well watered on their northern side, the rainfall amounting in some places to 250 inches a year. The southern slopes, however, are almost arid, especially in Hawaii, and crops are grown under irrigation. The decomposed lava rock makes a rich, deep, red earth most favourable to agriculture, and

HAWAIIAN ISLANDS

the more important islands contain considerable areas of this fertile soil

As your ship steams into the beautiful harbour of Honolulu, the capital (population, about 137,000), on the south coast of Oahu, you look out over a crescent-shaped beach fringed with coconut trees, and the white and pink roofs of a town almost hidden in luxuriant foliage. Behind it are sugar-cane fields, and in the distance the misty, bluish-purple of the mountains. The harbour is crowded at all times with Japanese and Hawaiian fishing boats, ocean liners, and the tramp steamers that bring manufactured goods to the islands, and

mats on the pavement, making and selling wreaths and ropes of flowers ("leis"), which the Hawaiian women wear upon their heads and about their necks. They are dressed in bright-coloured "holokus,"—wide "Mother Hubbard" dresses, which the early missionaries devised for the scantily clothed natives, and which are still worn today. The soft twanging of guitars forms the "theme song" of the islands. Everywhere one meets the Japanese (who compose nearly half the population of the islands), returning from the sugar-mills or from their work in the fields. Six miles south of Honolulu is Pearl Harbour, a United States coaling and naval station, one of the finest land-locked harbours in the world. On its flat eastern banks stand government buildings, barracks, shops and a great dry dock.

Sugar forms more than half of the exports of the islands. On the more elevated lands are great fields of pine-apples, which in value constitute the islands' second industry. There are also fields of sisal hemp, each plant looking like a rosette of spears, and forests of "algarroba" (a species of locust tree), where extensive bee-farms are kept for the large export trade in honey.

Oahu is the third largest island, and the greatest in population and wealth. The island of Molokai is famous for its leper settlement on a jutting peninsula in the north, and Maui, the second island in size, has some of the most important plantations.

Hilo, a little city with about 19,000 people, is the only port of the island of Hawaii. Beautifully situated on a broad smooth bay, with two superb mountains in the background and luxuriant tropical gardens throughout the town, Hilo has many attractions that fully compensate for its reputation of having rain "eight days in the week."

The island of Hawaii has much to charm the sightseer in its snow-capped mountains and tangled tropical forests, its deserts and sparkling waterfalls, its lava flows, and its plantations of coffee and sugar. But its chief attractions are its great volcanoes—Mauna Loa, the largest, but not the highest, active volcano in the world, and Kilauea, with its ever-seething lake of molten lava.

Kauai is called the "Garden Island" because of its prosperous plantations of sugar, rice, and



Dorlen Lelah

SURF-RIDING IN HAWAII

Those who have been privileged to indulge in it swear that there is no sport more exhilarating than that of surf-riding. Mounted on their boards, the riders are borne shoreward by the rushing tide at 30 miles an hour. Honolulu, where this photograph was taken, is famed for its surf-riding facilities.

return with sugar, coffee, and fruit worth more than £20,000,000 in a single year. Near the dock the water is alive with brown-skinned boys, swimming about and shouting, ready to dive for coins which the passengers throw into the water. To and from the harbour there now fly giant seaplanes on their way across the Pacific. Honolulu has wide streets and fine parks, hotels, clubs, schools, and churches, and one of the finest aquariums in the world. Outside the business centre gardens with tropical flowering trees everywhere border the streets. Europeans and Americans are few compared with the thousands of picturesque Orientals and mixed-blooded Hawaiians. There is a "Chinatown," where the streets are lined with queer little shops, and filled with gaily clad Chinese men, women, and children. At other places you find Hawaiian girls sitting on

SCENES OF WORK & PLAY IN SUNNY HAWAII



Pine-apples are the most important of the fruits grown in Hawaii and in its genial climate they ripen quickly in the open. A pine apple plantation forms a remarkable example of tidy agriculture, for the pines are planted in rows of perfect regularity. The top photograph shows such a plantation with row after row of pines symmetrically planted and intersected by paths equally regular. The picturesque costume of the natives of Hawaii is known all over the world, and these girls dancing at Honolulu wear the familiar raffia skirts and necklaces of flowers.

Photo E. A. Dorian Leigh

pine-apples It was here that Captain James Cook (qv) first stepped on Hawaiian soil, in 1778 The next year Captain Cook lost his life in an attack by the natives while he was attempting to recover from them a stolen boat

Cook called the islands the "Sandwich Islands" after his patron, John Montagu, the fourth Earl of Sandwich, the head of the British Admiralty, but "Hawaii," the name used by the natives, is the one by which they are now known Although Cook was not the first white man to visit the islands, his famous journals first made their geography known to the civilized world The islands were then governed by chiefs who constantly waged war against one another Shortly afterwards (1795) they were all united under the famous King Kamehameha I, whose descendants reigned for almost 100 years Many missionaries came to the islands from America and Europe, and through their efforts the people were taught reading and writing, and converted to Christianity In 1893, when Queen Liliuokalani attempted to abolish the constitution which King Kamehameha III had been forced to give to the people, a revolution took place The queen was deposed, and application was made for annexation to the United States Hawaii was made a republic in 1894, and annexed to U S A in 1898, in the Spanish-American war

The area of the eight principal islands is 6,449 sq miles with a population of about 393,000, of whom nearly 150,000 are Japanese

Hawk. The name of hawk is popularly applied to most birds of prey, other than vultures, eagles, and owls, and thus includes goshawks, sparrow-hawks, buzzards, and harriers

The sparrow-hawk, which is one of our two common birds of prey, is still largely treated as a foe and mercilessly killed Yet in many ways this bird is one of the farmer's best friends, for it feeds largely on vermin It does, however, eat large numbers of small birds, and sometimes seizes small chickens to feed its young, but the damage it does is little in comparison with its services It is a short-winged hawk, greyish above, with a pale breast barred with grey or black The nest, built in a tree, is made of sticks and roots, and there are from three to six eggs, pale bluish-white, with red-brown spots and blotches The young are at first covered



John H. Flickers

YOUNG SPARROW-HAWK

When first hatched from the egg, hawks, like many other birds, are just balls of fluffy down, though none the less fierce for that. This sparrow-hawk youngster, however, is outgrowing the down stage, and you can already see his first wing feathers, while his strong beak and claws are well-developed

with white down and are very fierce little birds In former times the sparrow-hawk was one of the most popular birds employed in the sport of falconry (qv)

Even more common than the sparrow-hawk, especially in the more open country which it prefers, is the kestrel This is the bird you may often see apparently standing still in mid-air, its wings spread out, its head slightly dropped, its tail flickering up and down to help it keep stationary Actually, the tips of the wings are also just moving, but this you can hardly notice This habit has also earned for the kestrel its apt name of "wind-hover" It feeds on mice, insects, etc., as well as small birds, and it is perhaps even more useful than the sparrow-hawk yet keepers, still ignorant and thinking only of their employer's pheasant chicks, shoot these birds

The kestrel uses the old nest of some other bird, such as a crow, or builds in a hollow tree or hole in a cliff or in masonry Its eggs are covered all over with red-brown blotches In colour it is a much browner bird than the sparrow-hawk, from which its long wings and tail further



Fred Jefferson

FATHER HAWK ON THE NEST

The males of many birds assist in the incubation of the eggs, taking their turn with their mates Here is a male kestrel (a kind of hawk) sitting tightly on the red-brown eggs contained in the rough nest of sticks. You can distinguish this bird by its regular spots and by the single bar across the tip of its tail

HAWK

distinguish it Every year several pairs of kestrels nest in London, sometimes in the Houses of Parliament

The harriers, of which the marsh, hen, and Montagu's harrier all breed in Britain, are very rare, and were it not for protection would certainly become extinct, as indeed they almost were some years ago They feed largely on partridge and poultry chicks, and are therefore very unpopular with keepers and chicken farmers, who shoot them whenever possible East Anglia is the headquarters of these birds, though the hen harrier breeds more in the Shetlands All the harriers nest on the ground

Other hawks in Britain, besides the buzzard (*q v*), are the merlin and the hobby, both small and fierce The former is the typical hawk of the northern moorlands, the latter of the woodlands in the south and southern midlands But whereas the hobby suffers from the greed of collectors, who, knowing that they can sell the eggs, rob every nest they can find and make this little bird of prey rarer than ever The merlin nests on the ground among deep heather, the hobby in trees

Hawkins, SIR JOHN (1532-95) Hawkins was a contemporary of Sir Francis Drake, and was associated with him during a long life on the high seas He played a prominent part in the prolonged naval warfare with Spain during the reign of Queen Elizabeth

The admirals of those days were not particular whom they hurt in the pursuit of their ambitions, but some of the enterprises of Hawkins fell even lower than the low standards of honour and justice of his own times He had, for example, the unenviable reputation of being the first Englishman to engage in the abominable slave traffic,



MERLIN GROWING UP

This young merlin has reached a later stage in the development of his plumage than the sparrow-hawk in the opposite page He has nearly lost his down, and his feathers are well enough developed for him to have left the nest of his own accord.

counter, all the English ships with the exception of two were captured or sunk, with their treasure



SIR JOHN HAWKINS

One of the most adventurous Elizabethan seamen, Hawkins was also one of the least reputable, for he was captain of the first 'slavers' to fly the English flag He was treasurer of the Navy, and fought with distinction against the Armada

which assumed such horrible dimensions in succeeding centuries

He made three voyages to the coasts of West Africa, where he bartered his goods for cargoes of wretched negroes, who had been kidnapped by armed ruffians, often of their own race These unhappy people he took out to the Spanish Settlements in America, and sold them into slavery in exchange for such commodities as sugar, ginger, and pearls This nefarious trade was very profitable to Hawkins, and it is said that even Queen Elizabeth herself fitted out two ships and placed them under his command

This later expedition proved unfortunate, however The fleet of Hawkins was surprised by a Spanish admiral in the Bay of St Juan de Vloa, and, after a desperate encounter, all the English ships with the exception of two were captured or sunk, with their treasure

One of the two vessels afterwards foundered at sea, the only one to return safely to England being a small vessel commanded by Francis Drake Hawkins managed to effect his escape in that vessel, and afterwards rose to high rank in the Navy, becoming treasurer in 1573

When England was threatened with invasion by the forces of the Spanish Armada (see Armada, Spanish) Hawkins was vice-admiral of the fleet sent to meet the Spaniards In association with Drake, and the other "men of Devon," Hawkins showed great courage and ability in connexion with the operations and engagements which resulted in the complete defeat of the Armada He was knighted for his distinguished services

Hawkins, like Drake, was a Devonshire man—he himself hailed from Plymouth—and in 1595 they set forth on a joint expedition

against the Spaniards. But they quarrelled, and these enmities, together with the failure of their schemes, hastened Hawkins's death. He died of fever off Porto Rico, November 12, 1595 (See Drake, Sir Francis)

Hawthorn. Milton mentions the hawthorn in his pictures of happy pastoral scenes

And every shepherd tells his tale
Under the hawthorn in the dale

Many of our other poets have commemorated the charm of this lovely shrubby tree, which is often known as may

The hawthorn (*Crataegus oxyacantha*), a member of the rose tribe grows wild throughout Europe, in northern Africa and western Asia. It is often more bush than tree, and is frequently less than 25 feet high. It forms a dense growth of handsome foliage, which in most species turns to brilliant colourings in the autumn. In the early spring there is a profusion of fragrant bloom, sometimes tinged with pink, but mostly white.



THE GLORIOUS 'MAY' OF THE HAWTHORN

All over England, when the "may," as the flowers of the hawthorn are called, is out, you may see sprays such as this. But when it comes to picking them, it is no easy matter, for every spray is guarded by short, strong spines, hidden close to the stems by the mass of white flowers. The leaves, too, are hidden and not fully developed as yet.

The fruit, known as "haws," and usually red, with hard seeds, is as fine a sight in autumn as the flowers are in spring, but birds soon strip the trees when frosty weather comes. Besides the wild hawthorn, many fine members of the genus *Crataegus* are cultivated in gardens. One very interesting type is the famous "Glastonbury thorn." This tree flowers at Christmas time, and the old story is that the original tree sprang from the staff of St. Joseph of Arimathea, being planted there by the saint himself.

Hawthorne, NATHANIEL (1804-64) The American author, Nathaniel Hawthorne, was a native of Salem, Massachusetts. His early life was of a sort to make him quiet and reflective. He was a lonely boy, for his father, a sea captain, died when he was four, and his mother shut herself away from the world.

After he left college, he lived almost like a hermit until he was 33. But he was very busy all this time, thinking and writing, though he published little. This long period of quiet

preparation accounts without much doubt, for his deep thought.

For a time Hawthorne lived at Brook Farm, where a group of literary men and women were trying an experiment in community life, and so he got the idea for his "Blithedale Romance."

He married Miss Sophia Peabody in 1842, and for a time they lived in Concord, Massachusetts, in the "Old Manse," in intimate friendship with Thoreau and Emerson.

Then, because he was unable to earn enough by writing to support his family, he took a position in the Salem custom-house. Under the influence of the old atmosphere that had so strongly touched his imagination, his thoughts began to take definite shape in the story that made him famous, "The Scarlet Letter" (1850).

HAWTHORNE READING TO HIS CHILDREN



Here is Nathaniel Hawthorne in his library reading from his 'Tanglewood Tales' to his little daughter Una, aged 9, and her brother Julian, two years younger. See how interested they look! Like so many other children they loved these fascinating stories of the Greek gods and heroes, and could repeat most of them by heart before the book was printed.



MAKING HAY WHILE THE SUN SHINES

E. H. Tattersall

In the hot days of summer one of the pleasantest sights in our countryside is a field in which the hay is being cut, carted, and stacked, and many novelists and descriptive writers have told of its charming combination of sight and smell. This photograph was taken in the Isle of Arran, in the Firth of Clyde, and shows sturdy haymakers piling the cut grass in the little, round stacks favoured in that region.

After it was published, as he said, "fame was won," and his future was secure. "The House of the Seven Gables" and "A Wonder Book for Boys and Girls" appeared in 1851, and "Tanglewood Tales" in the next year.

Later, as consul at Liverpool, Hawthorne had a chance for European travel, and during this time he visited France and Italy. Broken by ill-health and saddened by the Civil War, he did not live many years after his return in 1860.

None of Hawthorne's novels could be called bright and cheerful, though they have touches of quiet humour. They are overhung with a sense of mystery and unseen influences. Many of his tales are symbols or allegories. His stories for children were treated with the same care and thought as his novels for older folk. Hawthorne was a true artist, who took time and pains to make his language the perfect expression of his thought.

Hay. To holiday on an English farm during haymaking time is to experience the healthiest, joyfullest and jolliest time imaginable. For hay is the first harvest of the year, first to repay the farmer for long months of toil, and the men, women and children of the countryside rejoice at this token of Nature's bounty. Everyone is agog with excitement and energy for the hay must be harvested before the weather breaks.

In brilliant sunshine, under blue skies, with larks soaring overhead and the air laden with the scent of the new-mown hay—an aroma not to be matched in the laboratories of perfumers—the work of mowing, and swathe-turning goes on to the sound of laughter and song. Here, indeed, you see the life of the English countryside at its very best.

Even the animals in the field respond to the all-pervading atmosphere of the haymaking season, as if sensing in this their winter's security, for from the standpoint of feeding farm animals, especially for use during the months when the pastures are brown and dead, there is no fodder to compare with hay.

In England and Wales, about 1½ millions of acres of the best land is put under hay as permanent grass, clover or rotation grasses. Its value is computed at £4,500,000 per annum on an average. This acreage is raised from legumes such as clover, peas and beans, and from grasses such as timothy, meadowsweet and lucerne.

In order to keep a large portion of the proteins, sugars and other soluble matter stored in stalk and leaves by the growing plant, most hays are cut while the grass is still in flower and before the seed matures. If left standing too long, the stems and leaves rapidly lose their nourishment, becoming dry and useless for feed.

Sometimes two or more crops may be obtained from the hayfield in a year. It is usually cut and left on the field about three days to dry or "cure" in the sun. When properly done, curing develops a desirable flavour, and the characteristic aroma which makes the meadows "sweet with hay." To prevent it from drying too rapidly, and to protect it from rain, it is raked into windrows or put up in cocks. About a week after cutting it is loaded in hay racks, and hauled to the barn or stack. Hay tedders, hay rakes, and hay loaders greatly lessen the work, and hay presses have come into quite general use to bale the hay because the bulkiness of the loose hay is a great disadvantage in storage or transportation. The introduction of grass drying plants, whereby the full succulence and food values of young grass is maintained, to be employed later in the winter feeding of animals, is a great advance in agriculture. But haymaking, with its delightful characteristics, will always remain on the smaller farms of England.

Haydn, FRANZ JOSEPH (Pron hi'-dn) (1732-1809) No musician was better liked than Haydn, and the nickname "Papa Haydn," by which he was known, expresses the great affection in which he was held by all who knew him. He

was like a father to his associates, as he was also to all young and struggling men of talent.

Haydn's own father, a mechanic of the town of Rohrau, in Lower Austria, was a man of refined tastes. He was fond of music, and the evenings of Haydn's early childhood were spent listening to his father playing the harp while his mother sang the folksongs of Hungary, the themes of which later found their way into some of the finest compositions of the master.

As a child Haydn showed marked ability along musical lines, and at the early age of eight was made a chorister in the chapel of St. Stephen, in Vienna. At the age of seventeen his voice broke. Because of some boyish prank he was expelled, and found himself destitute.

Ten long hard years followed. Hungry, cold, ragged, but always devoted to the art of music, Haydn struggled against poverty, and at last fortune smiled. He was made director of the orchestra of Prince Esterhazy, at that time the finest in Austria, and for thirty years he held this position. During this time his compositions were most numerous, and his fame as a composer spread to Leipzig, Paris, and London.

The friendship which sprang up at this period between Haydn and the great Mozart was one



HAYDN CONDUCTS A DRAWING ROOM CONCERT

The painting by A. Rosier from which the above is taken shows the great composer supervising a performance of his music—not in a great concert-hall however, but in the much more intimate surroundings of his own home. Sitting at his ease, with score in hand, he directs the little company of musicians who, at his bidding, make the salon ring to the echo with the dainty, sparkling creations of his fertile and brilliant brain.

of great value to both the composers. Mozart was so frank in his recognition of the younger man's work that he said he never heard one of Haydn's compositions without learning something from it, and called him "the greatest composer in the world." Haydn profited no less from the friendship, for it was from Mozart that he derived much of the mastery of orchestral effect that marked his later symphonies.

When 58 years of age Haydn came to England. He was received with the greatest enthusiasm and Oxford University conferred on him the degree of Doctor of Music. During his stay of 18 months he produced his opera "Orfeo," nine symphonies, and numerous other compositions, among them the accompaniments of more than 100 Scottish songs.

In his 67th year Haydn's great oratorio "The Creation" was produced. Among the compositions of his declining years was the Austrian national anthem. He died in Vienna, during the French occupation of that city, and French officers were among the mourners at his funeral.

Haydn's compositions are numerous, including 125 symphonies, 76 quartets (which are the most distinctive of his works), three oratorios, 54 sonatas, 16 masses, and a large number of smaller pieces of church music.



RICH CROP OF HAZEL-NUTS

Usually, the hazel-nuts occur only in ones or twos, but here is a fine spray with much fuller bunches. Each nut is held safely in its papery "shuck" until it is ripe, when it falls, leaving the "shuck" behind. You can see, too, the typical leaves of the hazel, broad and serrated, with a narrow point.

Hazel. Although the hazel furnishes effective little rods for hoops and baskets and crates, it is known chiefly for its nuts. Some cultivated varieties grown in England, such as the filbert, are collected for the market, but the majority of the members of this group are mere shrubs or bushes, and the nuts have little market value. Hazel-nuts lie in leafy cups in clusters of two, three, or four, and from their light brown shade we get the colour term "hazel." The oil pressed from hazel-nuts is used by perfumers and painters, and in medicine.

In certain European lands a forked hazel twig is used as a divining rod for pointing to the place where precious minerals or other objects lie hidden, or where water may be found.

The hazels belong to the birch family (*Betulaceae*). The scientific name of common hazel is *Corylus avellana*.

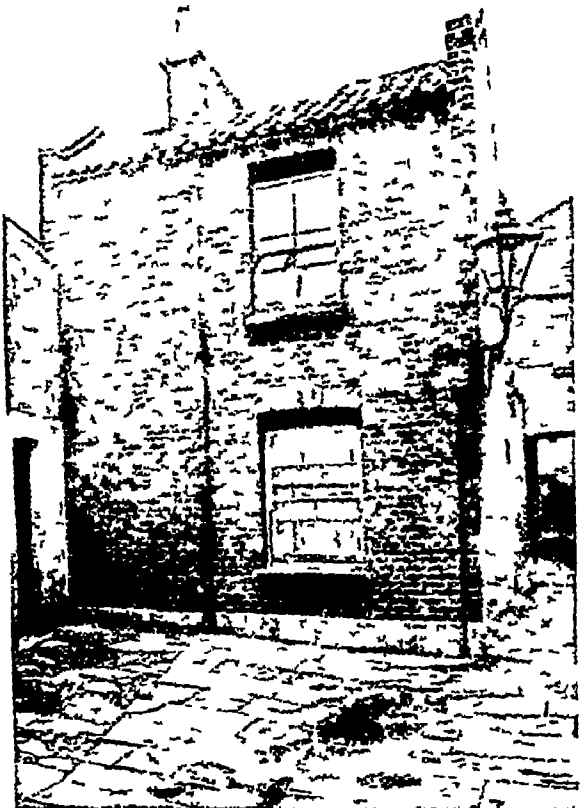
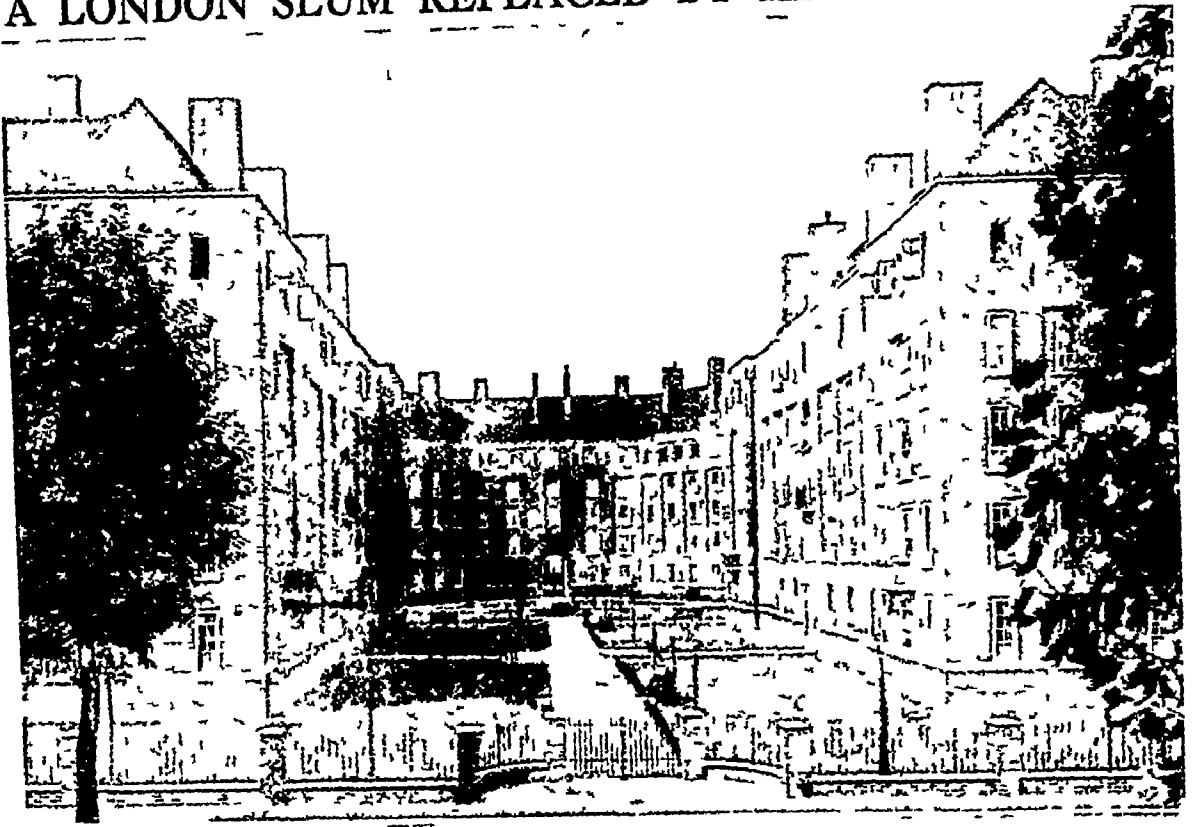
Health, MINISTRY OF. All matters concerning the health of the people of England and Wales are looked after by the Ministry of Health. It was established by Act of Parliament in 1919, and took over the work previously performed by the Local Government Board in the organization of the National Health Insurance, certain duties connected with the welfare of children from the Board of Education, others formerly discharged by the Privy Council, together with most of the powers of the Home Secretary under the Lunacy and Mental Deficiency Acts. The department is presided over by the Minister of Health.

Its establishment just after the close of the World War was a sign of a change in the public and official attitude towards health and disease. It was a recognition of the fact that good health is a national asset, and that it is one of the duties of the State to see that its citizens are enabled to live healthy lives. The public health services now cover the whole country, and there are hundreds of doctors in the Health Service whose job it is not only to cure people who are ill but to see that they never become ill.

This change from curative to preventive medical action on the part of the State is one of the brightest features in modern social legislation. It recognizes that everyone, from the newly-born infant to the oldest, is a citizen of potential value, or deserving of recompense for past services to the State.

And so today we see the constant multiplication of ante-natal clinics, infant welfare centres, open-air schools, orthopaedic institutions, and other similar organizations designed solely to promote health and to convert C3 citizens into A1 members of the community, physically and mentally equipped to play their part for the good of the commonwealth. Inspired by the Ministry, slums are being rapidly demolished in our great cities, and are being replaced

A LONDON SLUM REPLACED BY HEALTHY HOMES



All three photographs in this page were taken on the same spot in a Lambeth slum area. Those above show a part of the China Walk area as it was originally, a narrow, ill paved alley, lined by old and insanitary houses. In their place the fine building shown in the upper photograph has been erected. Altogether five acres of slums like those above have been cleared in the China Walk area, and in their place six blocks, comprising 283 dwellings, have been built by the London County Council. The photograph shows the largest of the blocks, built round a garden quadrangle that is 300 feet long and 95 feet wide.

Courtesy of the London County Council



SCHOOLROOM OPEN TO THE SUN'S HEALTH-GIVING RAYS

Ideas as to the value to health of fresh air have changed during the past forty or fifty years. It was once thought that in cold and wet weather fresh air was dangerous to health, and nurseries and schoolrooms were kept at a high temperature with the windows closed. Nowadays children are kept as much in the fresh air and sunlight as possible. This photograph shows a modern classroom entirely built of glass. The front wall consists of a folding glass screen which is drawn back in fine weather, so that the children are practically in the open air, while in bad weather the screen forms a fourth wall.

by houses that are healthy and comfortable to live in. In conjunction with other Government departments the Health Ministry rigorously controls the standard of purity or freshness of all foodstuffs offered for sale, it superintends the administration of our hospitals, and it fosters or supports every movement, such as regular medical and dental inspection of school children, whereby the whole standard of national physique may be improved.

Although one of the youngest of post War Ministries, the Health Ministry has already proved the most successful and, from the point of view of national investment for future gain, the most promising. Thus, infantile mortality has been considerably lowered, the average expectation of life raised, and that dread scourge tuberculosis held in check. It is as yet too early to state in terms of gain the results of the national fitness campaign, but there can be no doubt that the health and tone of the nation, individually and in the aggregate, will benefit enormously.

Heart. Many popular expressions, such as "getting to the heart of the matter," and "winning another's heart," and "losing heart" when we are discouraged, would tell us, even if we did not know in other ways, that the heart holds a vital place in our lives. It is the pump upon which we depend to force the blood to the

farthest extremities of the body, and when anything goes wrong with this living pump, our very life is in great danger.

By the beating of the heart we can judge pretty accurately the well-being of the other organs of the body. For if any one of them is in trouble, the beating of the heart is usually affected. The beat is either faster or slower, stronger or weaker, according to the particular ailment. When all is well, the tiny baby's heart beats about 120 times a minute, while the normal grown person's heart beats only about 72 times. Small animals, like the rabbit, have rapid hearts, like the baby.

The arteries which carry the blood from the heart are like flexible tubes possessing elastic walls. As a result, we can plainly feel the beating of the heart at certain points, where the big arteries come close to the surface of the body. The blood is forced into these arteries in a spurt, followed by a slight pause and then another spurt. The elastic walls of the arteries, in order to cope with each spurt as it comes, must stretch and then contract. So instead of a smooth flow of the blood we have a wave-like motion, which we can feel. We call this the "pulse," and it can be most plainly felt on the wrist or at the side of the throat.

With the exception of certain simple forms, all animals have an organ which does this pump-

HEART

ing work—from such low species as the earth worms, which have just a tube with muscular walls that can contract in a regular rhythmic way, to the fishes with their two chambered hearts, snakes, frogs, and toads, whose hearts have three chambers, and the birds, brutes, and Man, whose hearts have four chambers. Thus, from the way in which the heart is made, we can trace something of the ancestry of an animal.

In the human body, the heart is situated near the centre of the upper or chest cavity. It is a pear shaped—but slightly flattened—pouch, with very powerful muscular walls. The large end or base of this pouch points upwards and backwards towards the right shoulder, while the small end points downwards, forwards, and to the left. The position of this end is so close to the surface that we can feel it beat, hence we often speak of the heart as being on the left side, when in reality it is very nearly in the centre. In the grown man or woman, the heart is about 5 inches long and about $3\frac{1}{2}$ wide. It weighs from 9 to 11 ounces.

We think of our hearts as working day and night, constantly and without rest. But this is not quite true. The real work is done in contracting, the relaxing at the end of each contraction is a passive process. Then there is a slight pause before the next contraction, which is a resting phase. These pauses and the relaxation preceding them total about 15 hours in every 24, so we can say that the

heart works only nine hours a day. During these rest periods the heart feeds itself. Though it moves only about 6 ounces of blood at each stroke, it beats about 100,000 times in a day, so that the work done by the heart is equivalent to moving about 12 tons in each 24 hours. The heart must be kept rested and fed, or its work is much hindered and its structure over-strained.

The walls of the heart are made up of three coats—an outside coat, a middle one, which is a very powerful muscular layer, and an inner coat, very thin and delicate, which lines the heart and also forms part of the doors, or valves.

A partition runs down through the middle of the heart which divides it into two absolutely separate portions (the right and left sides). This really makes two distinct pumps, which work at the same time, but handle somewhat different kinds of blood. Each side is again divided by a cross-partition into an upper and a lower chamber. The upper chamber of the heart is called the "auricle" (right or left, as the case may be). The lower chamber is called the "ventricle" (right or left). In the partitions between there are doors called "valves".

The door on the right side has three sections ("tricuspid valve"), and it is so hinged that the blood flowing into the lower chamber, or ventricle, will close the door when the chamber is full and prevent a backward flow, for the door will open only in one direction. On the left side, the door between the auricle and the ventricle has only two sections ("mitral valve"). It is

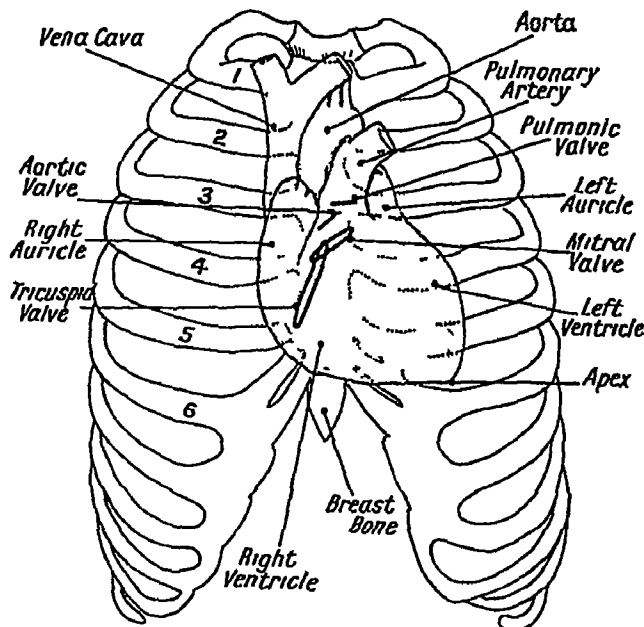
hinged, and acts very like the door on the right side.

Opening out into arteries from both ventricles are other doors, made in three sections and called the "semilunar valves," because they somewhat resemble a half moon in shape. These doors open and close automatically as the blood passes through. A doctor can tell with a stethoscope whether the valves are working properly by the sound the blood makes in passing through them.

When we look closely at this double pump, we find, entering the

right auricle, large vessels (veins) which have gathered up the blood from all over the system and brought it back to the heart. This blood is lacking in oxygen and has much carbon dioxide, a waste material. Entering the right auricle, this dark or "venous" blood passes on through the valve into the right ventricle, and then through the semilunar valves into the pulmonary artery, which carries it to the lungs.

While in the lungs, the blood gets rid of this carbon dioxide (which the lungs then breathe out), and takes up the life giving oxygen, which the lungs have breathed in. The refreshed



THE POSITION OF THE HEART

This diagram shows the position of the heart in the human body. It lies mainly on the left side of the chest, its apex being behind the space between the fifth and sixth ribs, about $3\frac{1}{2}$ in from the mid-line of the breast-bone, or sternum. The working of the heart is shown in the diagram in page 2042.

HEART

blood is then gathered up in the pulmonary veins and carried back to the heart. Here it enters the left auricle. This cycle is known as the lung or "pulmonary" circulation.

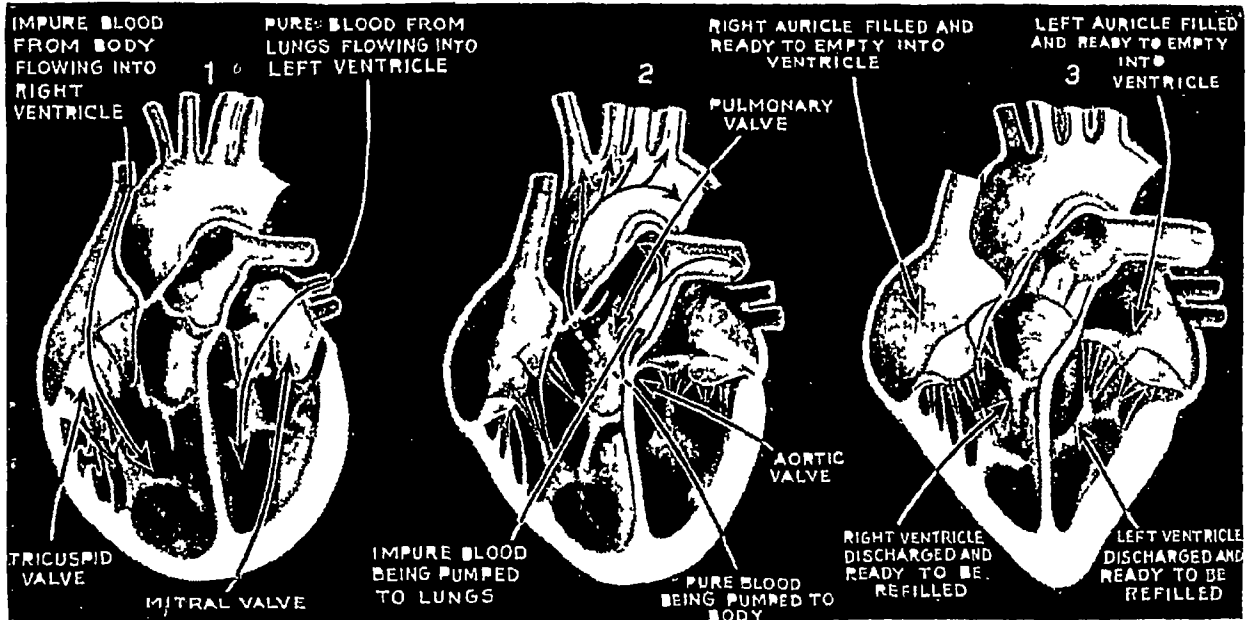
The blood now contains oxygen, and is ready to be sent all over the body. It is now bright scarlet in colour, and is called arterial blood.

On entering the left auricle, it flows (partially forced by the contracting auricle) through the door into the left ventricle, and from there is

to the farthest extremity of the body, the muscular walls of the left ventricle are much more powerful than those of the right, which has to send it only as far as the lungs.

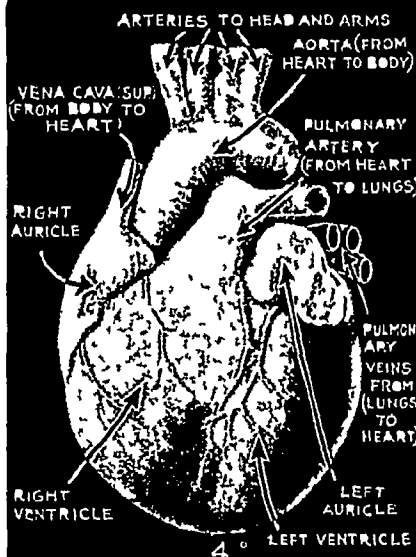
The heart is automatic, that is, it starts its own beat. But the action of the heart is regulated by two separate nerves. One, the "sympathetic nerve," makes it work faster, the other set of nerve fibres, known as the "vagus" nerve, behaves in just the opposite way, tending

HOW THE HEART KEEPS THE BLOOD STREAM FLOWING



forced by the contracting ventricle through the semi-lunar valve into the "aorta," the main outward passage, to be distributed all over the body. It passes through smaller and smaller arteries, until it finally gets into the thin-walled capillaries, from which it reaches every cell of the system. These capillaries are the tiniest blood-vessels in the body, and it is here that takes place the vital process of "osmosis," by which the actual exchange of the fresh food carried by the blood for the accumulated wastes of the tissue cell is accomplished. Osmosis simply means interchange of fluids of different densities and under different pressures through a septum, or membrane.

The blood is now ready to go back to the heart. It takes a drop of blood about half a minute to complete the cycle and get back to the heart. The circulation controlled by the pump on the left side is known as the "systemic circulation." And since it must send the blood



In the lower picture (4) you see how the divisions of the heart are named and how they connect to various parts of the body. Impure blood from the body comes to the right auricle. From there it passes to the right ventricle, which pumps it to the lungs. Returning purified from the lungs, it enters the left auricle, passes to the left ventricle, which pumps it out again to the body. The pumping process, shown in the three upper pictures, consists of a contraction which works from top to bottom of the heart on both sides at the same time. In (1) both auricles are filled, the right with impure blood from the body and the left with pure blood from the lungs, and the beginning of the contraction is forcing the blood through the valves into the ventricles. In (2) the contraction has passed to the ventricles. The "back pressure" has closed the valves to the auricles, and is forcing the blood from the right ventricle to the lungs and from the left ventricle to the body. In (3) the contraction is finished. The ventricles have been discharged, the auricles have been filled, and an instant later the process will be repeated.

to slow down the work of the heart. The two keep the action nicely balanced.

The heart may become diseased, mainly from one or two causes—either from overwork or by infection from bacteria carried by the blood. The infection often takes place in bad teeth or tonsils. The infected blood of necessity comes in contact with the delicate inside lining of the heart, and often causes an inflammation which prevents the valves from working

properly This inflammation may spread over the whole inside wall of the heart and bring about more or less serious results

We may overwork the heart by too violent or too prolonged exercise This compels the muscle to work too rapidly, depriving it of its rest period, and hence cuts down the food supply of the heart itself The heart may be permanently dilated or enlarged

Perhaps the valves get so overstrained as to tear them and more or less permanently disable them This is why we should never engage in

violent athletic exercise immediately following a meal The heart is already working hard to supply the digestive organs with extra blood to deal with the food, and, if the muscles are put in action at the same time the heart is overworked

Anything which tends to disturb the fine balance or regularity of the heart-beat will produce trouble if kept up—possibly resulting in palpitation (a too rapid beating) or an inability to contract and expand properly *See also the articles on Blood Physiology Respiration*

The MYSTERY of HEAT EXPLAINED

Since a primitive man first made heat by "rubbing two sticks together," people have wondered what it really was, many have even thought it is a separate substance How Science has unravelled this problem is told here

Heat. What is heat? For centuries even learned men were puzzled by this question They weighed a piece of metal and then heated



it, only to find that adding heat did not increase the weight They found, however, that adding heat did increase the size So these wise men of old were led to believe that heat was a mysterious fluid, which was invisible, weighing nothing, but which could flow in some way from the hot body to the cold body This fluid they called "caloric"

This idea that heat is a material substance was believed until about the year 1800, and old text books in physics speak of "caloric" flowing from one body to another Thus, caloric was said to flow from the hot coals to the kettle of water Then, in 1798 and 1799, two men, Count Rumford and Sir Humphry Davy, showed by experiments that heat could not be a material substance

In 1798 Count Rumford wrote to the Royal Society of London an account of experiments that he made while boring brass cannon in Munich for the Bavarian army He observed that in boring metal the tool and the metal both got hot, but Rumford asked "Where does this heat come from? What is this heat?" He insulated his brass block with felt, so that the heat could not come from outside, then he used blunt tools, and got fewer metal chips, but more and more heat, by using more and more mechanical work In his account he wrote "It is hardly necessary to add that anything which an insulated body can furnish without limitation cannot possibly be a material

substance It must be motion" He meant the motion of the particles of the body

Then, next year, Rumford's friend, Sir Humphry Davy, made another experiment to prove that heat was not a substance He performed his experiment one freezing winter day He contrived to rub together two pieces of ice in a vacuum, and found that he could melt the ice by friction, even when all near-by bodies were below the freezing temperature He then asked, "Where can this so called caloric come from?" The only answer was "There is no substance caloric Heat is simply motion given to particles or molecules"

From these experiments of Rumford and Davy the world should have learned the true nature of heat But it was not until 40 years later that the world realized the full truth of these ideas and experiments Then, in 1840, James Prescott Joule (q v) of Manchester, by churning up water and thus heating it, measured in long careful experiments the work needed to produce a unit of heat, finding the constant now termed "the mechanical equivalent of heat" We know from Joule's work that it takes 778 foot-pounds of work to produce a "British thermal unit" of heat

Thus these great men, Rumford, Davy, and Joule, showed us what heat is If you hammer a piece of iron it gets hot, because the blows of the hammer give motion to the molecules of the iron You rub two dry sticks together, and under good conditions you produce heat—that is, you set the molecules in high motion, so that the wood catches fire To explain heat, we must remember that all matter is made up of molecules, and that in all bodies, at temperatures that we know, the molecules are in constant motion That is, all bodies that we know have heat, which varies according to the motion of the molecules

Science has shown that if we could lower the temperature of a body to 459° below zero

HEAT

(Fahrenheit), then the molecules would be at rest—that is, the body would have lost all its heat. Such an intense cold as -459°F (or $-273^{\circ}\text{Centigrade}$), which is called “absolute zero,” has never been reached. Experimenters have produced temperatures within a fraction of a degree of it by the evaporation of a liquefied gas. Another method is to chill some substance, while keeping its molecules in action by a magnetic field. Removing the field causes the molecules to lose most of their motion. (See Freezing)

Matter has some very interesting properties when its molecules have so very little motion. All gases become liquids or solids, even helium becoming a liquid, and the molecules of a metal near the absolute zero are so close together that a current of electricity finds no resistance. Of course, no form of life can exist at such low temperatures, for heat is needed to maintain life.

If, on the other hand, we add motion to the molecules of a body, we make it hotter. In the electric arc we get the most rapid molecular motion that we have produced on the earth, a temperature of more than $7,000^{\circ}\text{F}$. It is still hotter on the sun, the temperature of that body probably being more than $10,000^{\circ}\text{F}$.

Two very practical questions for us about heat are “How can we get heat when we want it?” and “How can we transfer heat from place to place?” Our great source of heat is the sun. The sun continues century after century to send to the earth a constant stream of light and heat, by the method of radiation. Of radiation you will read later in this article. We cannot control the heat that comes from the sun, we can only use what Nature sends us. In some places, as, for example, at Pasadena, in California, direct use is made of the sun’s heat, which is transformed into power, but in general we get only indirect benefits from the sun’s heat.

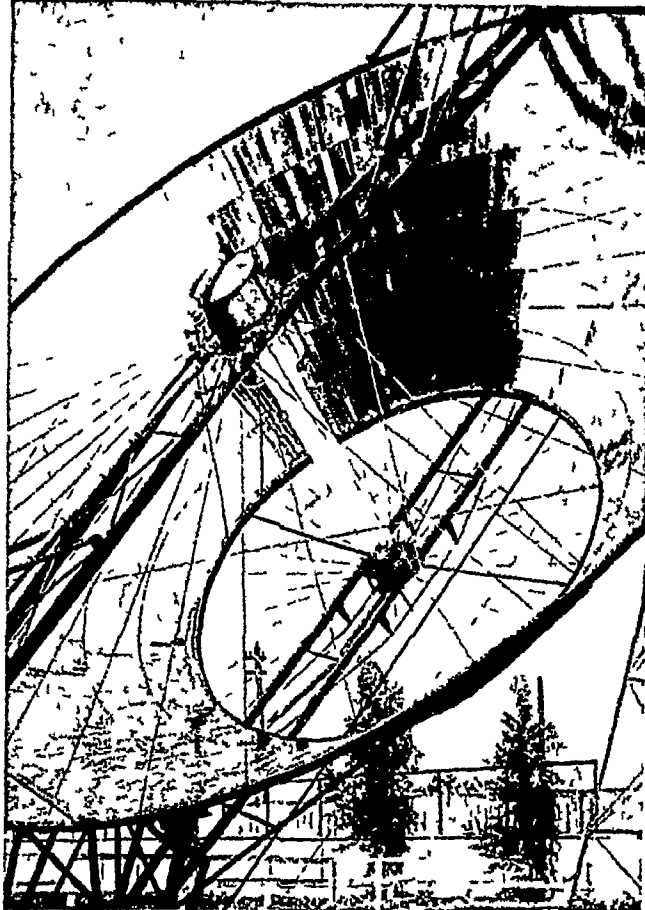
Different parts of the earth get very different quantities of the sun’s heat, and these different quantities also cause our seasons. In winter, in northern or far southern countries, the sun’s heat is not enough to keep our houses warm, so we must use artificial heat. We must also use artificial heat for cooking, and for producing steam for the engines in our factories and mills and power plants, and for our railway engines and steamships and steam rollers, and so forth.

Our great source of artificial heat is found in the burning of wood, coal, oil, and gas, but it must be borne in mind that much of this heat is “stored sunshine” from past ages. (See Fuels) The oxygen of the atmosphere combines with the carbon and gases of the fuel, and in so doing releases energy which sets the molecules in violent motion—that is, produces heat. There are many other chemical actions that produce heat, but the burning of coal, oil, and natural gas is the great artificial source of heat.

Another method of producing heat is by passing an electric current through wires (see Electricity), and many helpful devices make use of electric heating. Electric heating is, moreover, rapidly becoming cheaper, and is being

increasingly used for heating purposes. Electric heating is, of course, itself often dependent upon the burning of coal or oil to run the engines that drive the dynamos that produce the electricity. Heat from friction and impact also can never be generally available for large-scale heating. In many places, where water-power is available, cheap electricity is also possible.

Heat travels in three ways: by *conduction*, by *convection*, and by *radiation*. When one end of an iron bar is placed in a fire, the rapidly moving molecules of the hot coals and hot gases strike against the iron molecules, and so the iron molecules that touch the fire are given violent motion. These first molecules pass the motion



POWER FROM THE SUN'S HEAT

Sunlight is indirectly the source of all heat and therefore of all power, and it is now being used directly for the production of power. The photograph shows a “sun motor” at Pasadena, California. The umbrella-like wheel contains 2,000 narrow mirrors set so that they reflect the heat on to a cylindrical boiler and generate steam.

HEAT

along to other molecules farther back in the iron, and soon the heat travels or is conducted to the hand that holds the iron. That is, in conduction the heat motion passes along just as motion passes along a row of balls which bump against each other.

The best conductors of heat are the metals. Wood is a poor heat conductor. This is the reason you can hold a burning match, even while the wood burns only an eighth of an inch away. A metal wire would have to be several inches long for you to hold it in your hand when one end was red-hot. We wrap steam pipes with felt and asbestos because felt and asbestos are poor heat conductors.

Now take the hot iron bar out of the fire. The air about it is heated, and the hot air rises. In this case, the heat travels upwards by *convection*—that is, by being conveyed by the currents of heated air. In the hot air furnace for house heating, the heat is transferred to the rooms by convection—by the flow of hot air through metal ducts. It is by convection, using the flow of steam or hot water through iron pipes, that heat is transferred in steam and hot-water heating systems. In convection, heat is conveyed by moving the hot matter itself, as in the case of hot air, hot water or steam.

But heat can reach your hand from the hot iron bar when your hand is at some distance *beneath* the hot bar. There is no stream of hot air to the hand in this case, because hot air rises. In this case the heat travels neither by passing along from molecule to molecule, as in conduction, nor by the conveying of currents of hot matter, as in convection, but it flies directly across space. This is the way heat and light come to us from the sun across stretches of empty space. This method of transfer is called *radiation*. And what is radiation? Evidently it is not the same as the heat which is the swinging motions of the molecules of matter, for there is no matter to heat in the long stretches between the earth and the sun.



Heat is created and transmitted by the impact of molecules.



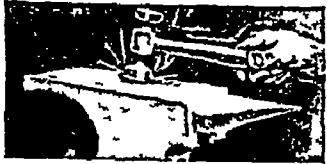
Molecules of the bar carry the heat to the hand by "conduction."



Heated air rises and spreads, carrying heat by "convection."



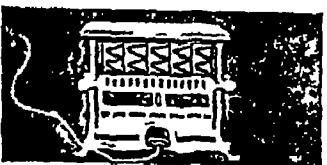
Heat travels in all directions by "radiation" through the air.



Impact between objects speeds up their molecules and so causes them to become heated.



The rapid motion of molecules undergoing chemical changes is the cause of heat in fire.



A heavy electric current passing through resisting wires creates heat.



The "British Thermal Unit" is the amount of heat needed to raise one pound of water one degree Fahrenheit in temperature.

FACTS ABOUT HEAT

A hot body, by the motion of its molecules, sets up waves in the surrounding ether similar to light waves, but invisible (*See Ether, Light*). They are called heat waves, in the ordinary sense they are not heat at all, but rays of energy that will produce heat in the objects they strike. When these heat waves strike an object, they are partly absorbed and partly reflected, and the energy of the absorbed radiation causes motion of the molecules of the body—that is, causes heat. Some bodies are better absorbers of radiation than others. Thus, a black cloth absorbs more radiation and reflects less radiation than a white cloth, hence dull black bodies get hotter in the sunshine than white bodies. This is the reason why people find white clothes cooler than dark clothes in summer.

Radiation—that is, heat waves in the ether—is produced by the vibrating molecules of hot bodies. As stated above, radiations come from hot bodies, and the sun with its great heat gives off an amount of radiation which is enormous compared with any other source that reaches us. Every square foot of the sun gives off as much heat as would be produced by burning 1,500 tons of coal on each square foot every hour. These heat waves, as stated, can be reflected and refracted as well as absorbed. Thus, at the focus of a lens, or burning glass, there is gathered both the visible (light) and the invisible (heat) radiation, so that fire can be started by putting paper or shavings at that point. A concave mirror can be used for this same purpose of concentrating radiation. The Greek philosopher Archimedes is even said to have set fire to the Roman warships off Syracuse by the use of a big burning glass or burning mirror.

There are two measures of heat, the *degree* of heat and the *quantity* of heat. The *degree* of heat we call the "temperature" of the body containing the heat. The more rapidly the molecules vibrate, the higher will be the temperature.



USING THE SUN AS A MATCH

When heat rays and sunlight pass through a magnifying glass they are concentrated at one small point, so that a piece of paper held here is easily set on fire

Temperature is measured by a thermometer. Our most useful thermometer, the mercury thermometer, shows the temperature by the position of the mercury in the glass stem, which is sealed at one end and formed into a bulb, containing the mercury, at the other. It is graduated either in Fahrenheit degrees or in Centigrade degrees. Two bodies can have the same temperature, and yet have very different *quantities* of heat—first, on account of the *mass* of the body, and, second, on account of the *kind* of matter. Thus, a bucket of water will contain much more heat than a cup of water at the same temperature. Experiment shows that it takes 30 times as much heat to raise a pound of water through one degree of temperature as it does to raise a pound of mercury. This property of the substance is called its “specific heat.”

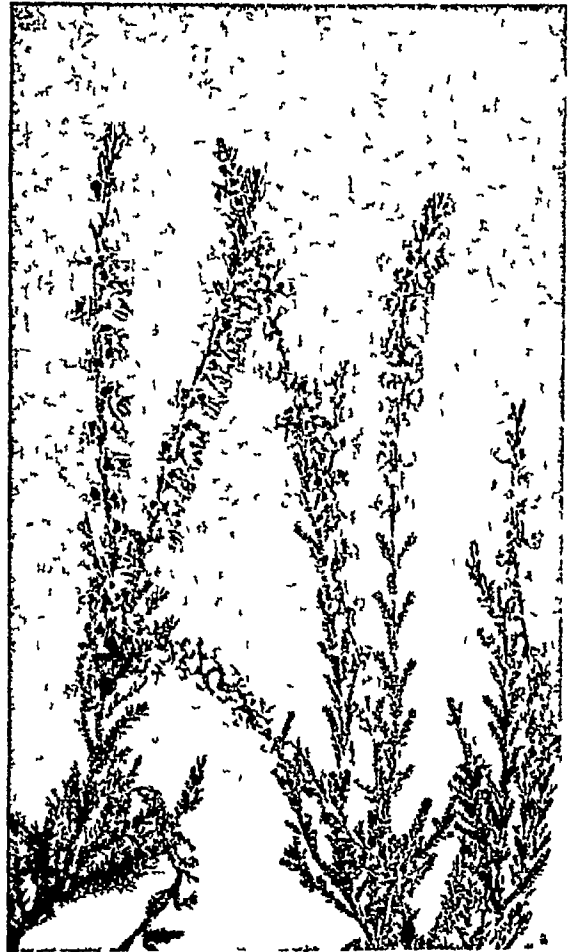
Quantity, as distinguished from degree, of heat is measured in terms either of “calories” or of “British thermal units.” A “calorie” is the quantity of heat or thermal energy used to raise the temperature of one gramme of water, one Centigrade degree. This is the unit used in most scientific work. A British thermal unit (B T U) is the quantity of heat needed to raise the temperature of one pound of water one degree Fahrenheit. The B T U is the unit used in most cases by British and American engineers. Thus we read in an engineering paper that a certain kind of coal “gives 13,000 B T U per pound of coal.” This means that the heat produced by burning a pound of this coal is enough to raise 13,000 pounds of water one degree F.

We know by experience that mechanical work can produce heat. Indeed, if our engines

and machines are not properly oiled, we get heat at the expense of work when we do not want heat. The reverse question is: Can we turn heat into mechanical work? This is just what James Watt and other great engineers have done, with such wonderful results, for modern industry. The steam-engine and the gas engine are the wonderful heat engines which get mechanical power from heat, and so are the sun motors at Pasadena pictured in page 2044.

It is the science of heat that has given us these marvellous engines to turn the heat stored in coal and oil and gas into power, to run our factories, to light our homes, and to transport our goods and ourselves across land and sea and through the air. But many of the old time methods of producing heat are being superseded, especially by electricity.

Heather. The “bonnie blooming heather,” which clothes the rugged Scottish Highlands with a soft vesture of purple, enters into the very life of the people, their songs and stories, as perhaps no other plant has done in any land. The heather (*Calluna vulgaris*)—or “ling,” as it is sometimes called—is found not only in



TRUE HEATHER

A. B. Dennis

This is the real heather, which is often known as “ling.” Its very numerous, tiny, triangular leaves and very small, pinkish-purple flowers are unlike those of any of the heaths such as that opposite with which it is often confused.

HEATHER

Scotland, but also throughout northern and western Europe. It is a small evergreen shrub, of the order *Ericaceae*, sometimes rising only a few inches above the ground, but often growing to a height of three feet or even more.

On its purplish brown stems are close leaved green shoots and feathery spikes of tiny flowers, usually rose lilac in colour, but ranging from deep purple to pure white. White heather is somewhat rare in the wild state, in Scottish superstition this beautiful plant is regarded as a bringer of good luck.

Not only does this hardy plant lend beauty to the landscape, but it serves many useful purposes. The tops afford winter forage for Highland sheep and cattle, as well as for numerous birds such as grouse. The flower is a favourite of the bee, and heather honey has a delicious flavour. The larger stems are made into brooms, the smaller into brushes.

Owing to the scarcity of wood, the Highlanders in former times built their "shielings,



LOVELY BELL-HEATHER

It is easy to see why this plant gets its names, bell-heather refers to the flowers which are truly bell shaped as you see here while the name cross-leaved heath reminds you that the little narrow leaves grow in fours like a series of crosses all the way up the wiry stems.

covers large tracts of land, the ciliated heath, *E. ciliaris*, found in Dorset and Ireland, and the Irish heath, *E. mediterranea*. Of these, *E. ciliaris* is the finest, bearing long spikes of crimson purple flowers.

or cabins, of heather stems cemented with mud, and used it as a thatch, while heather laid on the ground with the small twigs uppermost formed a warm, comfortable bed for the warrior, as it still does for many a shepherd and hunter.

Often wrongly called "heather" are the various species of heath, members of the genus *Erica* and closely related to true heather. A number of these are common in Britain, the most familiar being the cross-leaved heath, or bell heather (*E. tetralix*), and the fine leaved heath (*E. cinerea*). The former has pale, almost pink flowers, the latter's blooms being of a rich purplish hue. Both these are common in most places where ling occurs.

Other species, which are very local, are the Cornish heath (*E. vagans*), which in that county often

MAKING an ARTIFICIAL CLIMATE

Here are discussed the all-important and closely-related problems of heating and ventilation in home and factory. Upon the correct management of these factors much of our good health depends.

Heating AND VENTILATION Until the 18th century the open fireplace was almost the only method of heating known, and this primitive and wasteful method is still the one used in most of our homes. In many countries today, however, heating by hot-air furnaces, by hot water or steam conducted through cast-iron pipes, and by various forms of oil, gas, and electric stoves, has been so perfected that houses and public buildings can now be kept at almost any temperature desired, regardless of the weather conditions.

The artificial temperature required to maintain the body in comfort and health varies with the individual's constitution and habits and age, but physicians consider a temperature of from 55° to 60° the most desirable.

In England and most of the other temperate and cold regions of the world, people accustom themselves to home temperatures of those amounts. But in Canada and the United States a higher temperature—70 degrees or more—is usually demanded.

To live in too high an artificial temperature is just as unhealthy as living in one too low. The great prevalence of colds, pneumonia and throat affections is attributed largely to the habit of living in overheated rooms and offices. The body is weakened and rendered abnormally sensitive, so that it cannot properly perform its functions when it is suddenly exposed to the colder air outside.

Overheating is especially likely to occur where not enough attention is given to keeping the air

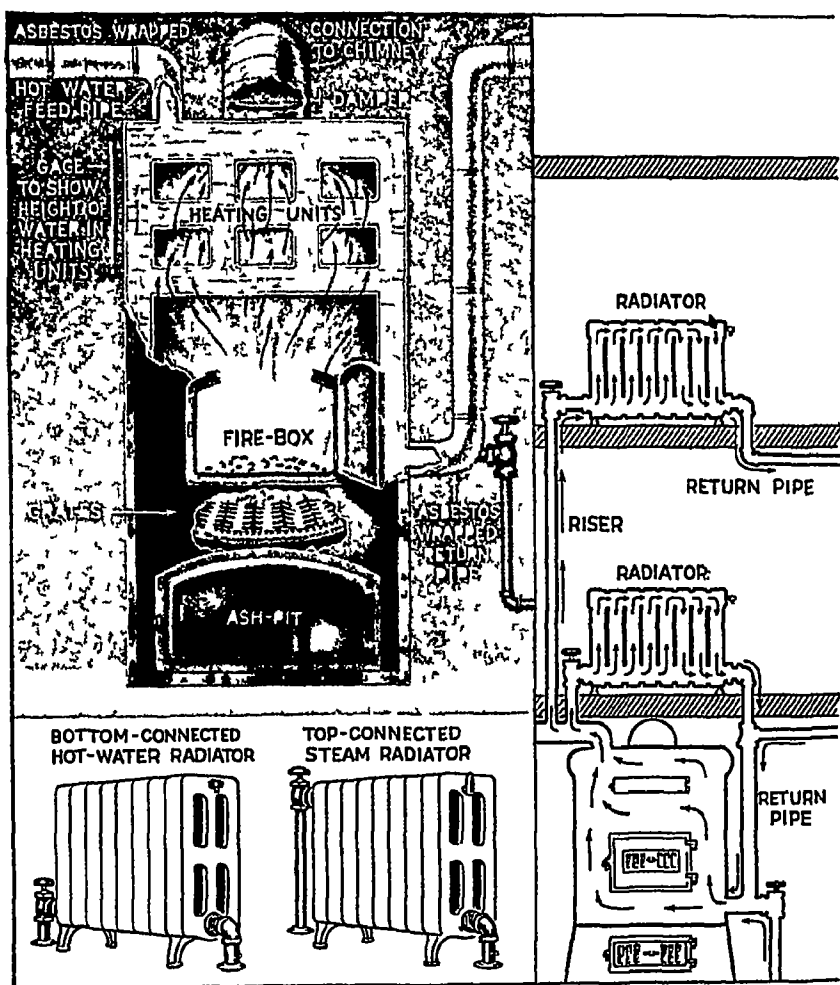
properly moist or humidified Dry air introduced into a room takes up moisture from plants, furniture, and the human body, with the result that the plants die, the furniture warps and cracks, and human beings feel chilly and their throats and skins become dry and irritated To make one feel comfortable in a dry atmosphere, the temperature may have to be raised to 75 degrees or more, whereas with properly humidified air a temperature of about 60 degrees will be enough for most persons suitably clad

In modern furnace heating plants, arrangements are made to introduce sufficient moisture by the use of evaporating pans With steam and hot-water systems it is harder to obtain proper humidity, for the common method of putting a pan on top of the radiators does not supply enough moisture, and the familiar use of a bowl of water in front of the gas stove is not much better

A large pan of water kept simmering on the kitchen range, with doors open to the rest of the house, will help, or a curtain may be suspended on a rod behind the radiator, with the bottom dipping in a pan of water There are also various patent appliances on the market

Humidity is measured by an instrument called a hygrometer (*g v*), one form being the wet- and dry-bulb thermometer With such an instrument one can see whether the house has the proper relative humidity or not In the manufacture of textiles, cigars, and paper, where humidity is a very important factor, this instrument is also used

Heating systems vary widely in efficiency Most fireplaces allow seven-eighths of the heating value of the coal to be wasted up the chimney Improved stoves realize as much as 80 per cent of the heat value Under ideal conditions, the hot-air furnace will convert from 50 to 60 per cent of the value of the coal into useful heat Steam and hot water systems are still more economical, and big heating plants realize 80 per cent of the coal value



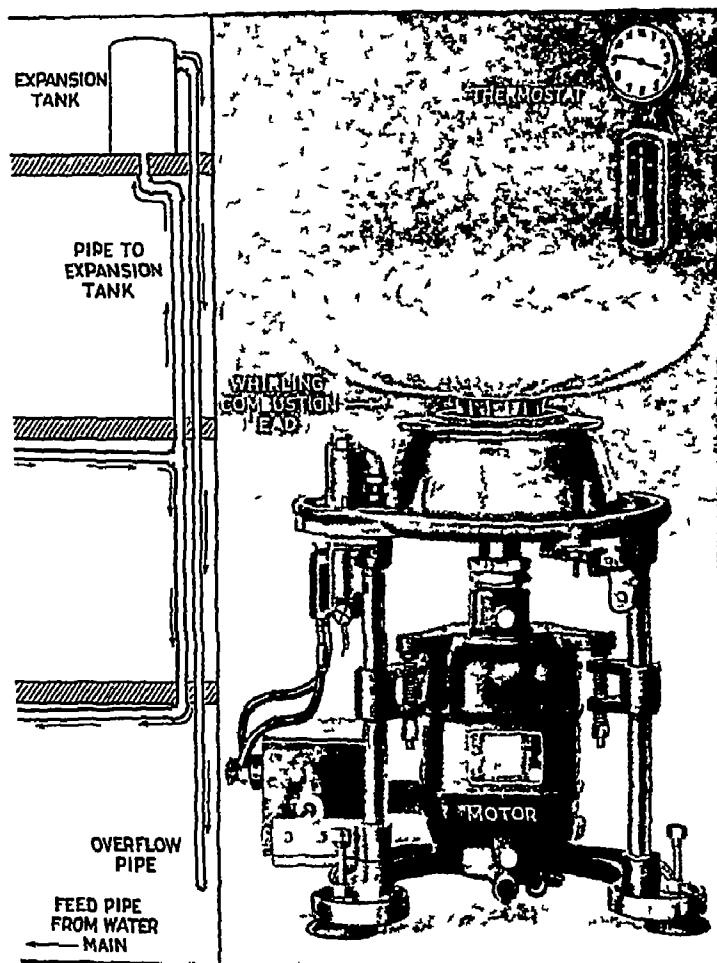
HOW OUR HOUSES ARE HEATED BY HOT WATER,

To start a hot-water system, we fill the boiler from the water main, and light the coke fire, as shown upper left The diagram shows how hot water then rises from the heater, circulates through the radiators, and comes back through the return pipe. Expansion of the heated water is taken care of by the expansion tank and the overflow pipe (opposite page) A two-pipe steam heating system operates similarly, save that steam, instead of water, rises from the boiler and returns to it condensed to water

It is claimed that a building that requires 12 tons of coal to warm it for a given time with a furnace will require only nine tons with the steam system, eight tons with hot water, and still less with the new vacuum or vapour methods Such figures as these are, of course, not to be taken as absolute, for varying conditions will change them

All methods of heating are classified as *direct* or *indirect* radiation In direct radiation systems, the room is warmed by apparatus inside it, such as an open fire, a stove, or steam or hot-water radiators In indirect systems, the air is first warmed by a furnace, or by steam or hot-water radiators outside the room, and then brought in through an opening in the floor or wall

A less common method is known as the *direct-indirect* In this the steam or hot-water radiators are inside the room to be heated, but the air is brought directly from the outside into a sort of box at the base of the radiator, and heated as it passes upward over the surface of the pipes



STEAM, AND THE 'AUTOMATIC' OIL BURNER

In this page is a rotary-type oil burner, which may be used instead of a coke fire. The combustion head, whirled by an electric motor, breaks up the heavy oil into a fine mist and mixes it with air for burning. A thermostat (top right) automatically regulates the temperature of the water in the boiler and pipes by controlling the air supply. The clock switches on or increases the heat at any time desired.

For small houses and buildings, the hot air furnace is still extensively employed. Such furnaces heat by indirect radiation. Cold air is brought by passages from outside the house, or from one of the rooms, usually the hall, this is warmed as it passes over the heated surface of the furnace, and then distributed to the various rooms by a system of pipes, with openings which may be opened or closed in order to regulate the temperature.

Hot water and steam heating systems employ a hot-water heater or steam boiler, a furnace, and a system of pipes and radiators. In the hot water system, water heated to 140 degrees or more is circulated through the pipes on the principle that hot water is lighter than cold, and therefore tends to rise. If the distance is great, the circulation must be assisted by pumping.

In steam heat, steam at a temperature of 212 degrees or more is circulated under pressure. When hot water is used, circulation begins, and the radiators begin to give off heat, as soon as

the water is above the room temperature. In steam heat, there is no heat in the radiators until the water in the boiler has been raised to 212 degrees, and the steam has developed sufficient pressure to circulate in the pipes.

Hot water radiators give off only about two thirds as much heat for each square foot of radiating surface as steam radiators do, so the pipes and radiators must be larger. The first cost of a hot-water system is therefore greater than the cost of a steam heating plant. But it is cheaper to operate, for water will circulate with a very low fire, and supply the amount of heat needed in mild weather, while with steam heating it is difficult to regulate the amount of heat in the radiators, usually there is all the heat the radiator will supply, or there is none.

Hot water radiators usually operate noiselessly, while in steam systems, if they are not carefully designed, the water sometimes condenses and lodges in pockets through which the steam has to force its way, thus producing a noise as if the pipe were being hammered.

The vacuum and vapour systems represent a recent improvement in the art of heating. In steam heating, a large part of the fuel has to be used to drive air from the circulating system. In *vacuum* heating, the air is exhausted from the boiler and pipes so that the steam does not have to force its way against the pressure of the atmosphere. Furthermore, since the water is heated in a vacuum, steam is produced at a temperature as low as 98 degrees.

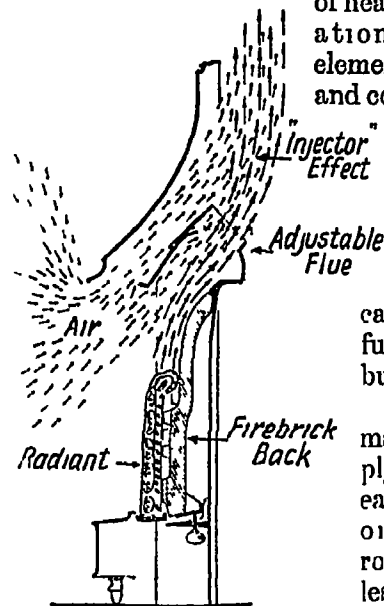
Vapour heating is conducted on the same principle as vacuum heating, except that the apparatus is so contrived that the vapour produced from water below the normal boiling point—*at about 90 degrees*—is circulated before more than a few ounces of pressure is recorded by the gauge. In what is known as the *vacuo vapour* system, the two principles are combined to give a range of temperature for the radiators from 90 degrees to 240 or more.

Electric and gas heaters are largely employed in rooms used only on occasion. In electric heating, the current is passed through wires made of an alloy which offers great resistance, and the temperature of the heating elements is raised to such an extent that heat is given off to the room. Some systems use "black" heat, i.e., the wires are not made incandescent,

HEATING & VENTILATION

but in other systems (for instance, the electric "fire") the heating elements are made red-hot or even white-hot

Modern gas "fires" are constructed on scientific lines, from the point of view not only of heating but of ventilation. The heating elements are shaped and constructed so that



GAS 'FIRE'

The modern gas heater has two vents. The lower carries off the fumes from the stove, while the upper one draws in a large volume of air from the room.

they project radiant heat into the room. In the canopy is a flue which allows air-circulation and carries off the harmful products of combustion.

It has been estimated that the supply of fresh air for each person in an ordinary living room should be not less than 1,800 cubic feet an hour. This means that in a room 12 by 10 feet and 10 feet high, in which there is only one person, the air

should be changed every forty minutes. Where this is not done, vitality is lowered, one feels chilly and sleepy and often suffers from headache. Proper ventilation is especially important in sleeping-rooms. Windows should be raised from the bottom and lowered from the top to provide a circulation of air even in the coldest

weather. If the wind is too strong, screens may be used. In ordinary dwellings, nearly enough fresh air is usually supplied by so called natural ventilation, that is, by the draughts through doors, windows, etc.

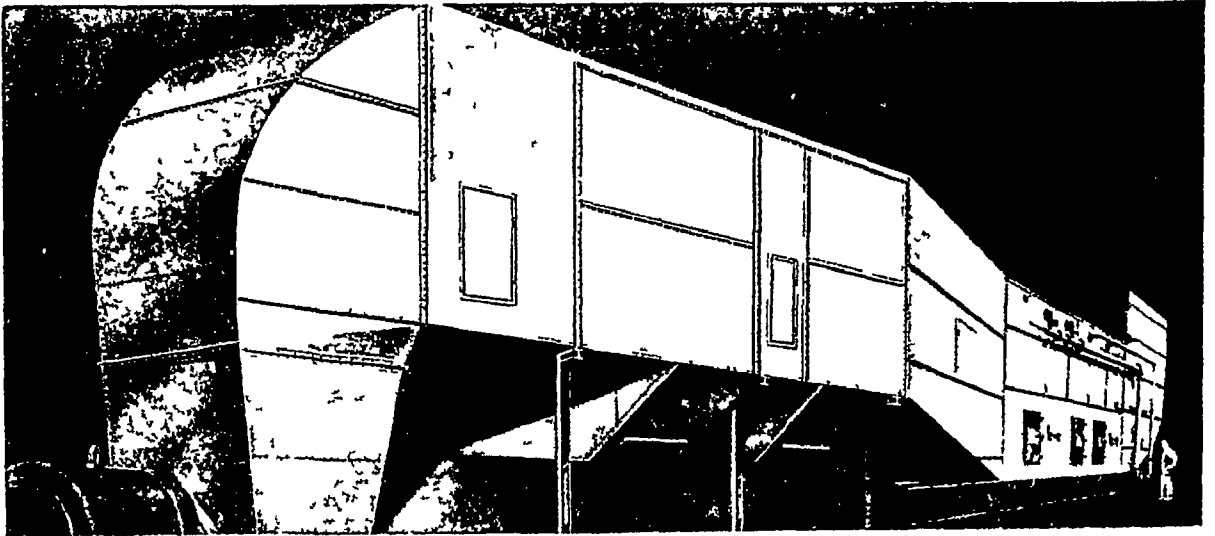
It is known with reasonable accuracy just how much heat will be lost by the windows, the outside walls, etc., and how much fresh air will have to be heated with proper ventilation. So, from the plans of big buildings, it is possible to reckon with considerable accuracy just how large a heating plant will be necessary.

Cleaning and Cooling the Air Indoors

The latest development in heating and ventilating engineering is "air conditioning." This provides buildings with air that is scientifically correct for comfort and health, or for certain industrial processes.

In the 19th century cotton and tobacco factories began installing equipment to keep the air properly moist. About the time of the World War theatres found the air cooling apparatus paid, by drawing patrons in summer. By 1934 air conditioning was being used in hotels, restaurants, railway trains, office buildings, and even in homes, especially in America.

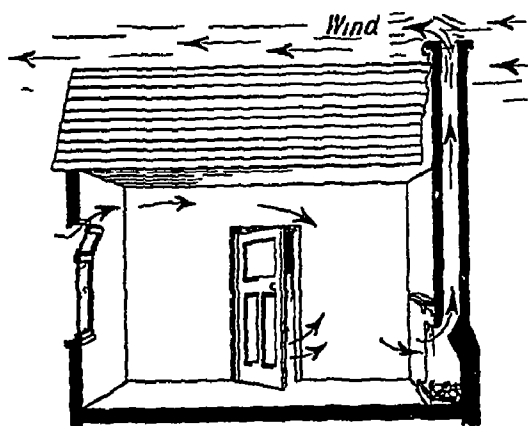
For complete comfort indoors, air should have the right temperature, be free from dust and smoke, and, especially, should have the right humidity. (See Evaporation). Windows must be kept closed, so that all air used is drawn through the conditioning apparatus. In winter, the apparatus warms the air, then passes it through a water spray, which removes impurities and supplies moisture for humidity. In summer, a refrigerating device cools the spray water to just above freezing. The spray chills and cleans the air, and corrects undue humidity.



WHERE FOUL AIR IS MADE FRESH AGAIN

Recent scientific investigation has shown how essential it is not only that factories and workshops should be kept warmed and ventilated, but that the air should be free from dust, and in many modern factories, especially those engaged in manufactures likely to cause dust, elaborate plants are established to filter the air. The machine shown in this illustration embodies the latest principles of dust extraction. It has been erected at the factory of the Birmingham Small Arms Co., it treats 50,000 cubic feet of air in a minute, and consumes 1½ to 2 tons of fuel a week.

Courtesy of the Norman Turner Engineering Co.



HEAT AS A VENTILATOR

A room with a coal fire or a gas fire is ventilated by a process similar to that of human breathing. Fresh air is drawn in through the window or door, and the bad air is drawn down from the upper part of the room and up the chimney by the upward draught from the fire.

by condensing excess moisture. Conditioned air may be conducted in ducts through the structure, or each room may have a "conditioning unit," supplied from a central source with cold or warm water and heating energy.

A few years of experience with air conditioned theatres and trains suggested to engineers, business men, and the general public that the greatest field of all for air conditioning should be the home. But central apparatus might cost several hundreds of pounds to install, and slightly less per year to operate. The first household units, therefore, were made small to serve one room. They sold well enough to suggest that air conditioning could be made the basis of a giant industry, comparable to the manufacture of motor cars or wireless.

Hebe. (Pron hē'-bē) In Greek mythology the goddess Hebe typified eternal youth and joyousness. She was a comely maiden, with sparkling eyes and rounded form, ever smiling, and Milton in his famous poem "L'Allegro" speaks of—

Nodes and becks, and wreathed smiles,
Such as hung on Hebe's cheek.

She was the daughter of Zeus (Jupiter) and Hera (Juno) and served the gods as cupbearer, until one day she tripped and fell. Then the lovely youth Ganymede took her place and Hebe became the wife of Heracles (Hercules) after he had been made a god.

Hebrew Language AND LITERATURE
To most persons of European descent, the chief representative of the Semitic tongues is Hebrew, the sacred language in which the Old Testament was written, and in which its Scriptures are still read in the Jewish synagogues. It is the best known member of a group of Asiatic and African languages known as Semitic.

The Semitic languages are divided into two great branches, the northern and the southern. To the former belong Hebrew, Phoenician, Aramaic, and Assyrian, while Arabic and Ethiopic are of the second group. Hebrew and Phoenician are so closely related that they are considered as dialects of one tongue.

The Hebrew language is very ancient, and was spoken in Palestine as early as 2,000 years before Christ. The words are short, for the most part, and the grammar and sentence construction are simple. Much is expressed in a few words, and, though often unformed, the language is full of strength and grandeur, with a deep sonorous quality that makes it well suited to poetry and the expression of religious feeling.

In common with other Semitic tongues, the parts of speech are derived from roots or word-stems having three letters. Originally the Hebrew alphabet was made up entirely of consonants, and the vowel sounds were omitted. Early in the Christian era, however, the vowel signs were inserted underneath the consonants.



HEBE, GODDESS OF YOUTH

Hebe was the cupbearer of the gods before Ganymede. Her Roman counterpart was Juventas, who typified also the eternal youth of the Roman state. This graceful statue of the goddess is by Thorwaldsen, the famous Danish sculptor, and is in the Thorwaldsen Museum at Copenhagen.



READING THE SCRIPTURES IN HEBREW

The Jews of Palestine still read the Scriptures in Hebrew from a scroll, which is the earliest kind of book. This Jew, reading from the synagogue scroll, is arrayed for prayer. He wears upon his forehead a phylactery—a small black box containing a miniature scroll to remind him to keep the law—and a scarf with fringes, in accordance with the command "Thou shalt make the fringes in the four corners of thy vesture."

American Colony, Jerusalem

Hebrew printed with the vowel-sounds indicated, is known as "pointed," and without them as "unpointed." The writing reads from right to left, like Chinese, and from the back of the book to the front.

With the exception of parts of the books of Daniel, Ezra, and one verse of Jeremiah, which are Aramaic, the entire Old Testament is written in Hebrew. This and a few inscriptions are all that remain to us of ancient Hebrew literature. In their daily speech, the Jews came gradually to use the Aramaic language of their Syrian neighbours, but Hebrew was preserved as a religious and literary language.

In the first four or six centuries of the Christian era, there grew up a great body of writings known as the *Talmud* (meaning "teaching" or "learning"), consisting of two parts. The first of these, the *Mishna*, or oral law, was written in Hebrew, and the second, the *Gemara*, or commentary on the law, in Aramaic. The

Mishna is a systematic collection of religious-legal decisions, developing the laws of the Old Testament. The *Gemara* is a great unordered mass containing arguments and opinions on the law, and much miscellaneous material—a "literary wilderness," it has been termed.

In its pages are poems, prayers, anecdotes, and maxims, together with science and mathematics; tears and laughter are mingled, while side by side with the investigations of the learned are the wisdom and superstition of the unlearned. Despite its faults, the *Talmud* is a very great work. It formed a bond between the scattered Jews, and kept alive their learning during the Dark Ages, making it possible for them to play a large part in the restoration of learning and the cultivation of science at the time of the Renaissance.

In the Middle Ages arose a body of literature which included what is called the *Cabala*, a mystical interpretation of the Scriptures based on the belief that every letter and number has a hidden meaning.

From early days the Jews have adopted the language of the country in which they happened to dwell. Even in the 1st century A.D., Josephus, the great Jewish historian, had written for the most part in Greek, probably because he could thus reach the greatest number of readers. His immortal "History of the Jewish Wars" was written first in his native Aramaic and then in Greek, but only the more

easily read Greek version has come down to us.

The Jews in Germany adopted German as their language, but they wrote it in Hebrew characters, and when persecution drove great numbers of them to the countries of eastern Europe, they carried this language with them. Mixed with some Hebrew and Slavic words, and written in Hebrew letters, this German dialect developed into the language known as *Yiddish* (from the German *jüdisch*, Jewish). It is widely used today among the Jews of Bohemia, Galicia, Lithuania, Russia, and other countries, being slightly changed by the addition of words from the languages with which it has come in contact. Within the last century particularly an extensive literature has developed. (See Jews)

Hebrides, (Pron heb'-ri-dēr), SCOTLAND. Shortly before his death in 597, St Columba, the Irish missionary, looked out upon the tiny island of Iona, one of the Hebrides, or Western Isles of Scotland, and uttered a memorable prophecy

HEBRIDES

"Unto this place, albeit so small and poor, great homage shall be paid, not only by kings and peoples of the Scots, but by the rulers of barbarous and distant nations, with their people also" And so it was For this island of only five square miles became, through the work of St Columba and his disciples, the most famous centre of Celtic Christianity From it missionaries were sent for the conversion of Scotland and northern England, and to it for centuries students flocked from all parts of the north Kings and chiefs were brought to it for burial, that their dust might



mingle with that of the "blessed isle" From the end of the 6th to the end of the 8th century Iona's fame was scarcely second to that of any place in the British Isles Then the Vikings swept down from the north, and not until the 13th century did the Norwegian kings give way to the Scottish kings

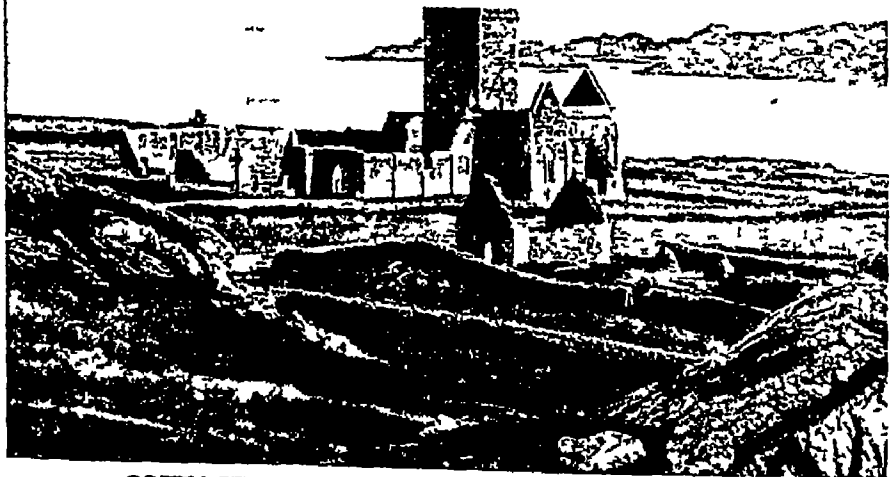
Semi feudal conditions continued until 1748, under the rule of native chieftains Great depression followed the changes then made,



F. Hardie

GATHERING SEAWEED IN SKYE

Seaweed is used by the crofters of the Hebrides as a fertilizer, and this sturdy woman is carrying a heavy load of it in the basket slung from her shoulders from the beach to the field



COTTAGE AND CATHEDRAL OF THE HEBRIDES

The photograph, left, shows a typical cottage home in Skye, and gives an idea of the mountainous surface that makes the island a land of magnificent scenery Above are the ruins of the Cathedral on the island of Iona. It dates from the time when Iona was the seat of a bishopric, but it was almost destroyed at the Reformation A part of it was restored in 1907

Photos R. K. Holmes J. J. Farguhar

rents became excessively high and large numbers of the tenants emigrated to North America. The potato blight in 1846 brought practically the entire population to the verge of starvation. Thousands were removed to Australia. Since then the system of land tenure has been revised and the inhabitants' lot greatly improved.

These islands off the west coast of Scotland are divided into two groups, the Outer and Inner Hebrides, by the ocean waterways of the Minch and Little Minch. The most important of the Outer Hebrides are Lewis-with-Harris, North and South Uist, Benbecula and Barra of the Inner Hebrides, Skye, Rum, Coll, Tyree, Mull, Colonsay, Jura, Islay, and Iona. Altogether, the Hebrides number over 500, but only 95 are inhabited. Of the total area of 2,812 sq miles, only 300 sq miles is cultivated, the rest being moorland and mountain. Sheep farming

cattle raising, fishing, distilling, slate quarrying, and the weaving of Scottish woollens are the main occupations of the people. While the country is poor, the scenery is wild and picturesque. The population of the two groups is 79,000.

Hector. The ideal hero of the Trojans, "glorious Hector" was the son of King Priam and Hecuba and the husband of Andromache. In the *Iliad*, Homer tells of Hector's valour during the siege of Troy by the Greeks, and of his death at the hand of Achilles.

To avenge the slaying of his friend Patroclus by Hector, Achilles tied Hector's body to a war chariot and dragged it round the walls of Troy, as is told in the accompanying story. Hector is represented not only as a brave warrior, but as a devoted son, husband, and father. One of the finest passages in the *Iliad* describes his final parting from his wife and infant son.

The Story of the Death of Hector the Brave

HIGH on the great tower of Troy stood the white armed Andromache (an-drom'-a-kē), wife to Hector, bravest of the Trojan warriors. By her side stood a nurse bearing his infant son Astyanax (as-tī'-a-naks). All day long the dreaded Greeks had been pressing her countrymen hard, and she looked out over the plain before the city, weeping and wailing like one frenzied, for she feared the coming disaster.

Suddenly she caught sight of her dearly-loved husband, who had come to the city to bid the elders and the women pray to the gods for help. Andromache ran swiftly to meet him, and with her went the nurse and the child. She clasped her hand in Hector's, and begged him with tears not to return to the battle.

"Come now, have pity and abide here upon the tower, lest thou make thy child an orphan and thy wife a widow."

But Hector of the glancing helmet could not be turned from the path of duty. "My soul forbiddeth me to shrink away from battle like a coward," he answered, and he stretched out his arms to his boy. But the child shrank crying to the nurse, frightened at the gleaming bronze and the horse-hair crest that nodded fiercely from his father's helmet. Laughingly, the great warrior swept the helmet from his head, and, taking his son in his arms, kissed him and prayed to the gods that he might grow to be a great man.

With the return of Hector, the sun-god Apollo befriended the Trojans. So it was that, with the aid of this swift-arrowed deity, Hector killed Patroclus, the most loved of the friends of Achilles, who was the greatest warrior in Greece. Because of this, Achilles swore vengeance and went out to do battle with Hector.

Once more, when Achilles entered the fight the tide turned for the Greeks, and they swept the fleeing Trojans back to the gates of Troy. The massive portals closed, and all the Trojans were safe inside save Hector, who stood without the wall awaiting the coming of Achilles.

Now Hector was the bravest man in Troy, but when he saw Achilles, god-like and terrible in shining armour which Hephaestus (Vulcan) had made for him, his heart was filled with a great fear, and he fled. Three times round the city they ran, and neither lost nor gained. As they came near, for the fourth time, to the hot and cold springs where the maids of Troy were wont to wash their garments, the goddess Athena (Minerva), who loved the Greeks, whispered to Achilles to stop and take breath. She promised to bring about his meeting with Hector. Then the goddess went to Hector, and, taking the shape of Deiphobus (dē-if'-o-bus), Hector's brother, said to him, "Wait, and we shall meet Achilles together. Thus shall you slay him."

Slain by Achilles' Spear

Hector took heart and closed with Achilles. The Greek threw his spear, but Hector bent low and it flew past him. The goddess Athena returned the spear to Achilles, but Hector did not see this and, throwing his own spear, struck the shield of the Greek. It bounded back from the god-made armour. Turning to seize a second spear from Deiphobus, Hector found him gone, and knew a goddess had tricked him. So, certain that he must die, he drew his sword and rushed towards Achilles, but the famed warrior bore down upon him like an eagle.

With one thrust, Hector lay dead at the feet of Achilles. To take full vengeance for the death of Patroclus, Achilles fastened the body of

HECTOR

Hector to his war chariot, and dragged it round the walls of Troy Andromache fell fainting into the arms of her maidens, as she looked upon the dishonour done to the body of her husband

Great was the weeping in Troy that the body of Hector had come into the possession of the enemy, for Achilles's heart was wroth, and he would not give it up for any ransom

Then to Achilles came his goddess-mother Thetis "I am the messenger of Zeus (Jupiter) to thee, my son The gods are displeased at thee because thou holdest Hector and hast not given him back Come, restore him, and take ransom for the dead"

And Zeus sent a messenger to King Priam, saying "Be of good cheer, O Priam Zeus, though he be afar off, hath great care and pity for thee He biddeth thee ransom noble Hector, and carry gifts to Achilles that may gladden his heart"

Hermes (Mercury), the wing-sandalled messenger of Zeus, guided Hector's aged father to the camp of the enemy In return for gold and rugs, mantles and cloaks and cauldrons, Achilles gave up the body

There was a nine day truce between the Greeks and the defenders of Troy, while the Trojans wept and mourned over Hector With many tears they burned the body of their dead hero on a lofty pyre, and then buried his bones under a great mound of stones "Thus held they funeral for Hector, tamer of horses"—*Retold from Homer's Iliad, Books vi, xii, xiv*

Hedgehog. In the ordinary course of events you are not very likely to see this little animal, for he goes about his business of devouring worms and insects and other small vermin principally at night But you may discover him, and his whole family, hidden in some deep bed of leaves in a ditch-bottom during autumn or winter, sleeping soundly away until the spring, or you may, if you are out and about

HEDGEHOG

late in the evening, come across the whole hedgehog family wandering about the garden in search of food When alarmed, they will all roll up into little prickly balls, their spines sticking out in such a way as to make them difficult to pick up, and even if you do capture one, don't take it indoors, for the warm atmosphere will bring all its fleas and other "friends" out over the drawing-room carpet! But put down a saucer of milk, if you think there are hedgehogs about, and if you watch you will see it being lapped up by one of these strange little creatures Farmers and other countrymen say that the hedgehog even steals the milk from the cow's udders, but no naturalist will believe this, and if you could prove it for



HECTOR SAYS GOOD BYE TO ANDROMACHE

In the thick of the fight Hector returned to Troy for the prayers of those in the city He was met by his wife Andromache who begged him not to return to the fight. But Hector put honour first, and is here seen taking his last farewell of Andromache, while in the background is their infant son with his nurse.
From the painting by Glucklich



A Brook

HEDGEHOG TAKES A WALK

This prickly little fellow is a hedgehog, one of the most attractive of our wild creatures. Here he is taking a walk across the grass, not seeming to care about the camera although usually he rolls up into a ball at the first sign of any strange object. He moves, too, most frequently at night.

yourself and persuade others, you would have ended an ancient controversy.

The hedgehog, whose scientific name is *Erinaceus europaeus*, is our largest and most important member of the order *Insectivora*, to which belong the shrews and the mole. It eats eggs and snails as well as insects, and is common through much of Britain. In other lands, too, there are other species, some of them without any spines. (See Hibernation)

Heidelberg, (Pron hi'-dl-bārg), GERMANY. This quaint and picturesque old University town, one of the most interesting in Germany, nestles between a wooded height and the beautiful River Neckar, which here leaves its gorge to enter the plain of the Rhine.

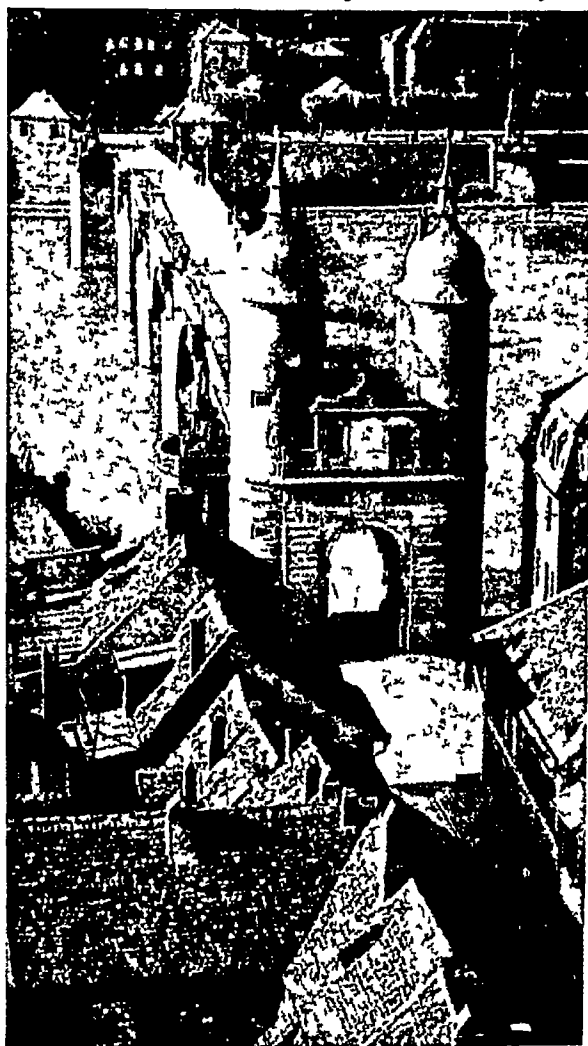
The old city consists principally of a long narrow street following the course of the river for about two miles. It grew up at the foot of the castle begun in the 12th century, which crowns the wooded height in the background. Added to at different periods, the castle became one of the largest and grandest in Germany, but it was almost destroyed during the devastating wars of Louis XIV of France, and, though later rebuilt, it was struck by lightning and again ruined in 1764.

Its reddish ivy-clad ruins are still beautiful, and in an old cellar beneath the castle is the great "Heidelberg tun," an enormous wine cask capable of holding about 47,000 gallons.

Heidelberg University, which has been the Alma Mater of many noted scholars, was

founded in 1386, and it is the oldest of German universities. It has over 200 professors and lecturers, and 3,000 students.

After the Reformation, Heidelberg was long the headquarters of German Calvinism. Formerly the capital of the Rhine Palatinate, Heidelberg passed to the former Grand Duchy of Baden in 1803. Population, about 84,000. **Heine**, HEINRICH (Pron hi'ne) (1797-1856). Heine was the most gifted poet of his day in



D. Leigh

HEIDELBERG'S ANCIENT BRIDGE

One of the most picturesque of all old German towns, Heidelberg, famous for its castle and its university, has also this fine old bridge over the river Neckar, which flows through the middle of the city.

Germany "I am a Jew—a Christian. I am tragedy—I am comedy," he once said. He was, indeed, a man of puzzling contradictions.

He was born of Jewish parents in Düsseldorf, in western Germany, but later joined the Lutheran Church in order to practise his profession of law, which he had studied at the universities of Bonn and Göttingen.

Heine's heart, however, was in literature, not in law. During a visit to a wealthy uncle, his life-long benefactor, he fell vainly in love with a very beautiful cousin. His spurned love found expression in exquisite poems which were published, and created a sensation. But his outspoken liberal views, together with his intense admiration for Napoleon, made him feel uncomfortable in reactionary Germany. Thus, the sorrow of his unrequited love and his political opinions combined to send him to Paris, where he felt more at home.

Although Heine wrote much about philosophy, literature, and politics, his fame rests on his poems. Many of these lyric gems have achieved the popularity of folk songs, and with good cause, for they have the true folk-



HEINRICH HEINE

Heine, a Jew by birth, is one of the most famous of German poets. He was converted to Christianity in 1825. Many of his poems, including the "Two Grenadiers" and "The Lorelei," have gained a world-wide fame.

From a contemporary drawing by F. Kupfer

pictures two children playing at "mothers and fathers" and entertaining company, amongst the many distinguished guests present being

song qualities. They are simple and full of warmth, and have the freshness and melody of the skylark's note. Some of them, such as "The Lorelei" and the "Two Grenadiers," are universally famous. His songs have been set to music by many famous composers. One of his delightful poems, "My Child, We Once Were Children,"

the neighbour's cat, and the sweet, pensive mood of the poem is broken by the satiric stanza.

Politely we asked how her health was
In the course of a friendly chat
(We've said the same things since then
To many a grave old cat.)



'THE LORELEI' OF HEINE'S POEM

Probably the best-known of Heine's poems is "The Lorelei," which tells the old German legend of the maiden who sat combing her hair on a rock in the river Rhine, and by her singing drew sailors to destruction, their boats being dashed by the current against the rock. On the left of this picture is the "Lorelei" rock jutting out into the river.

German Railways Bureau

But it is in his prose writings that Heine's most bitter flashes of wit appear. The "Travel Pictures," the most popular of all of Heine's prose writings, is full of sparkling wit.

The nervous headaches of his university days at length developed into a disease of the spine, which resulted in paralysis. He died in 1856. **Heligoland.** This tiny island has often been described as "The Gibraltar of the North Sea." It lies about 28 miles from the mainland of Germany, north west from the mouths of the Elbe and Weser rivers. Red sandstone cliffs, 200 feet high, face the sea on all sides of this triangular island. The constant pounding of the waves is gradually eating it away. Surrounding rock ledges show that the original size was five times as great as the present, which is somewhat over 100 acres. The inhabitants, mostly Frisian fishermen, number about 2,500.

In 1914 immense guns, masked behind powerful fortifications, protected the western entrance to the Kiel canal, as well as the mouths of the Elbe and Weser rivers and the port of Wilhelmshaven. With the batteries only 30 miles away, and the adjacent waters sown with death-dealing mines, these guns established a protective zone behind which the German high-seas fleet long lurked. It was the scene on August 28, 1914, of a brilliant naval action in which the British, under Admiral Tyrwhitt, inflicted serious damage on the German fleet.

HELIGOLAND

By the peace terms of 1919 Germany was compelled to dismantle the fortifications, but under Hitler's rule the re-fortification of the island was undertaken

Heligoland (or Helgoland, as it is called by the Germans) belonged to Great Britain from 1807 to 1890, when it was ceded to Germany in return for the surrender of certain rights in Africa. In ancient times it was a resort of sea-rovers

Helium. By the use of the spectroscope scientists had actually discovered helium on the blazing surface of the sun before they knew of the existence of the gas here on earth. Hence its name, from the Greek *helios*, which means "sun." Strangely enough, this namesake of the hottest body known to Man has since been used to produce the most intense cold ever observed. Helium under great pressure, cooled with liquid air and liquid hydrogen, itself becomes liquid at -452°F , and when this liquid helium is evaporated an even more intense cold (-456°F) is produced, freezing the liquid. (See Heat, Freezing Point)

Helium is the lightest of inert gases—that is, those that refuse to combine chemically with other substances. Because it will not burn it is especially adapted for use in airships instead of hydrogen, which is highly inflammable. In the

HELSINKI

World War of 1914–18 the United States attempted to produce this gas in quantities for this purpose. Up to 1915 the world's total output of helium was probably less than 100 cubic feet, and its market value was about £340 a cubic foot. Scientists, however, had discovered that helium occurs in some of the natural-gas fields of Canada and the United States, and plants were erected for its extraction.

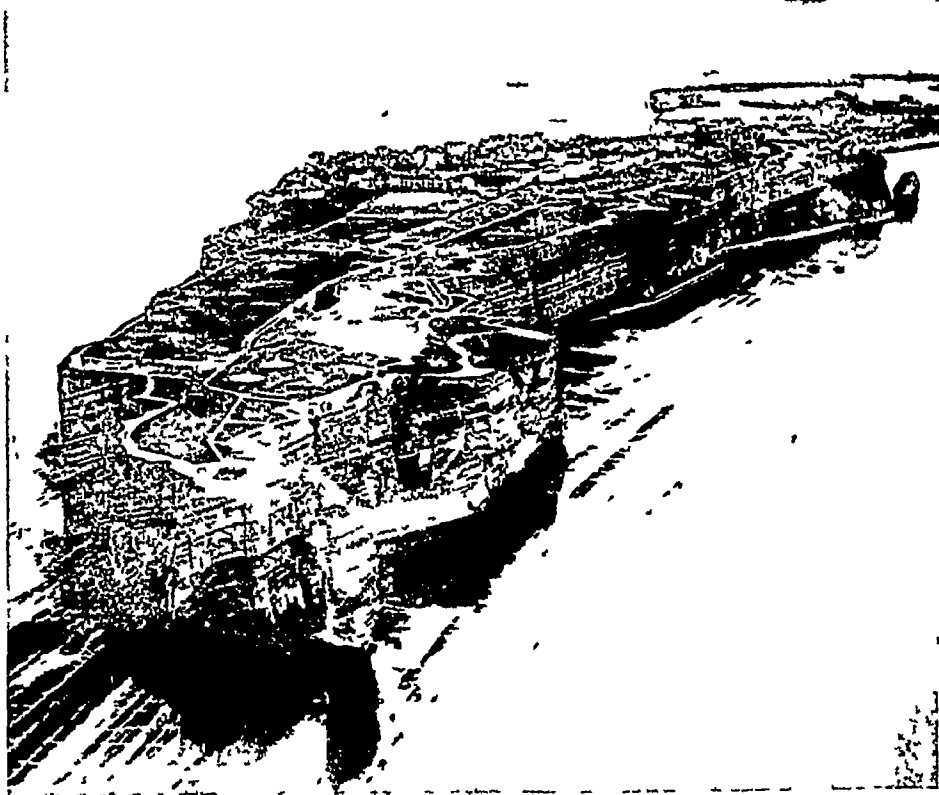
The process consists in refrigerating the natural gas under very high pressure, and then allowing it to expand. As it expands it becomes so cold that all of its constituents become liquid except helium, which is easily separated. Helium can thus be produced for about sixpence a cubic foot.

Helium exists in very small quantities in the atmosphere, in volcanic gases, and in gases from mineral springs. In addition, it is generated by radium, that amazing element which is constantly breaking down and producing other substances; some scientists believe that all the earth's helium has been derived from this source. (See Chemistry, Atom)

Hel'sinki, FINLAND After the World War a number of countries regained their freedom or changed their form of government, and in several cases the names of towns and cities were

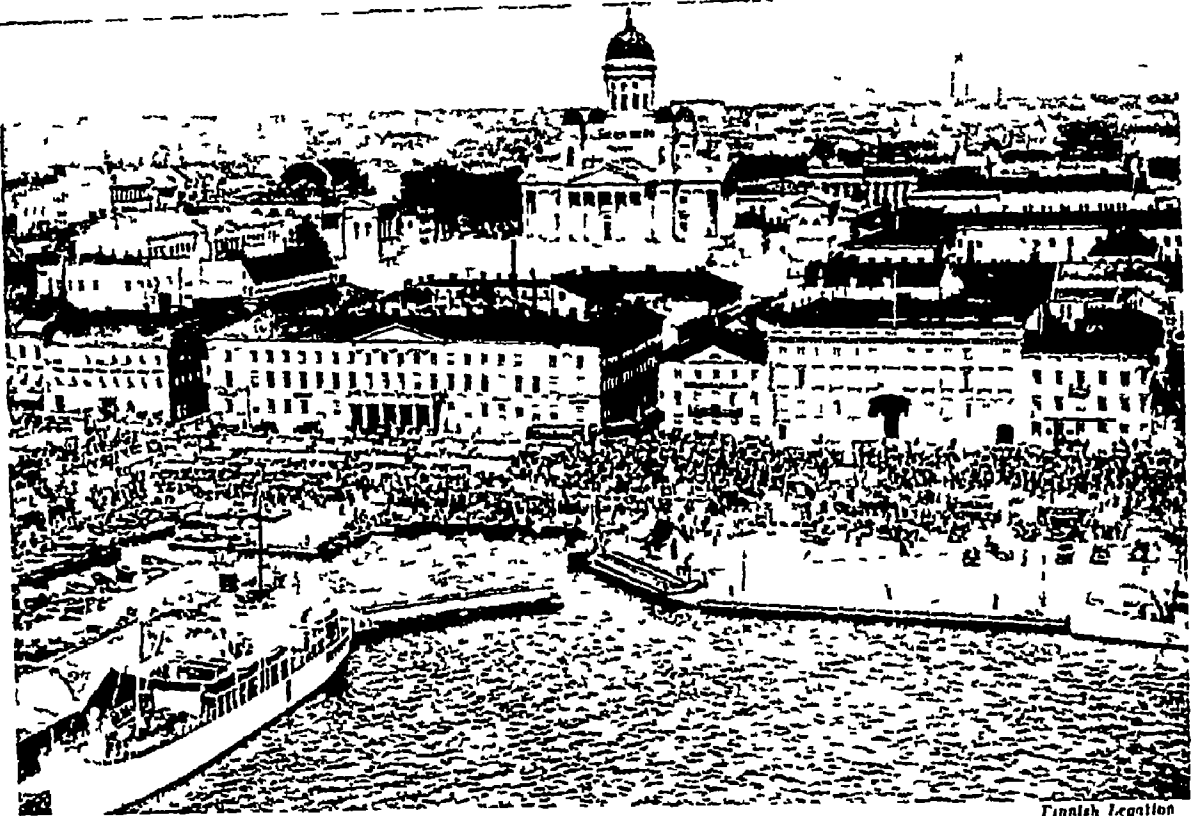
altered. When Finland was a part of the Russian Empire the capital was called Helsingfors, but when the country became independent the Finnish name Helsinki was restored to it.

Helsinki is beautifully situated on the Gulf of Finland. Its fine harbour, capable of taking the largest vessels, has been greatly improved in recent years, but from January until May it is ice-bound. The principal buildings are the Diet building where the Finnish Parliament meets, the President's Palace, the Lutheran Church of St Nicholas and the Uspenski Cathedral of the Greek Church. It possesses a broadcasting station, an airport



AN AIRMAN'S VIEW OF HELIGOLAND

Heligoland was strongly fortified by Germany before the World War, but it was dismantled under the terms of the Treaty of Versailles. The naval harbour was destroyed and its place was taken by a small commercial harbour, and the buildings were used for purely civilian purposes. This aerial photograph shows the island as it was in the post-War period. It has since been re-fortified under the Nazi regime.



Finnish Legion

HELSINKI BASKS IN SUMMER SUNSHINE

Helsinki, formerly known as Helsingfors, the capital of Finland, is the most northerly capital city in the world. It has three harbours and the South harbour, seen in this photograph, is the one at which passengers land. In the centre of the picture is the Lutheran church of St. Nicholas. In November, 1939, Russia invaded Finland and subsequently Helsinki was bombed many times.

and, in fact, all the amenities of a modern city. The University, though it was only moved to Helsinki from Abo in 1827, was founded in 1640. It is a flourishing institution, and in 1936 it had 353 teachers and about 6,600 students.

Hemlock. This is one of the plants you ought to know, for it is one of the most dangerous of any you will find in our English countryside. It is a tall, not ungraceful plant, with the typical deeply cut leaves and flat clusters (umbels) of white flowers of the order *Umbelliferae*, the parsley family. And its distinguishing feature is that the hollow, shining stems are liberally spotted and blotched with red or purplish markings, no other similar plant is marked in this way. Hemlock is a very deadly poison, of a type that kills one gradually, from the feet upwards, so that one just gently goes numb and dies, without any pain at all. It was by hemlock that Socrates died.

In "Evangeline," by the American poet Longfellow, there is a famous line, "This is the forest primeval, the mouldering pines and the hemlocks," and this refers to a quite different type of hemlock from that described above. The hemlock tree, in fact, is a conifer of the genus *Tsuga*, found especially in Canada. It has a slender, beautiful form, with the typical tall, straight trunk of the forest conifer, small



E. J. Bedford

DEADLY HEMLOCK IN FLOWER

Here is the hemlock, one of the most deadly of all our poisonous wild flowers. You can always recognize it by the purple blotches with which the stems are marked.

flattened needles, and much smaller cones than have most trees of this type. Of this hemlock there are several species, one of which is called the hemlock spruce, from its resemblance to the better-known spruce, and you may occasionally see one of them in plantations in Britain, although they are not largely grown here.

Hemp. Since very early times the fibre of the hemp plant, a native of temperate Asia, has been employed in making coarse cloth and rope, and today its cultivation is an important industry in China, India, various parts of Europe, and the United States. Some hemp is grown in England. In India and China hemp is cultivated not only for its fibre, but for its flowers and leaves, from which is prepared an intoxicating drug, called "hashish" or "bhang", this is either chewed, sucked, or drunk.

Hemp fibre, which comes from the inner bark of the stem, is valuable because of its length, toughness, pliability, and resistance to water. American dew-retted (softened) fibre is grey and coarse, but Italian fibre, which is retted by soaking in soft water, is soft, lustrous, and white.

Hemp is chiefly used for making rope, twine, shoe and harness thread, and the coarse cloth known as sacking. At one time it was used extensively in the manufacture of sail cloth and sheeting, and some of the finer quality is still made into cloth in China and Japan. Hemp seeds produce an oil which is used in the manufacture of soap and varnishes and are a deadly bait for certain fish. (See Fishing)

The term hemp is also used to designate many kinds of fibre in no way related to the hemp plant—among them Manila hemp, sisal hemp, and the Sunn hemp of India. Manila hemp is

a product of the Philippines, and is obtained from a species of banana plant, *Musa textilis*.

All cultivated true hemp is produced from *Cannabis sativa*, a member of the mulberry family, *Moraceae*, varying under cultivation from 3 to 16 feet in height and having angular rough stems. (See Rope and Twine)

Henry. HOLY ROMAN EMPERORS. There were seven emperors of this name in the history of medieval Germany and Italy. Perhaps the most important was Henry IV, who reigned from 1056 to 1106 (See *illus* under Gregory VII). He succeeded his father, Henry III, when he was less than six years old, and grew up wilful and headstrong amid bitter contests over the regency. A few years after he took power into his own hands, the storm of the Investiture conflict broke and lasted far into the reign of his son. The question was whether the Pope or Emperor—Church or State—should control the appointment of bishops and other high clergy, who were not only high officers of the Church but great feudal princes exercising power in the State as well.

In 1077 revolts in Germany forced Henry IV to cross the Alps into Italy in the dead of winter, and abase himself before the Pope, Gregory VII (*qv*) at Canossa. But the reconciliation did not endure, and proved to be only an incident in a long struggle for supremacy, which outlasted both Henry and Gregory.

HENRY VII (reigned 1309–1313) was the last emperor who sought to secure the claims and traditions of the medieval Empire. He died in Italy, frustrated in his attempts to restore any effective union of Italy and Germany. His son was John, the blind King of Bohemia, who fell at Crécy (*qv*).

Eight HENRYS of ENGLISH HISTORY

In following the careers of the eight kings named Henry who have sat on the throne of England, much is learnt of our history during the four centuries between Norman and Tudor times

Henry. **KINGS OF ENGLAND.** Eight Henrys have sat on the English throne since this name was first introduced into the royal line in the person of Henry I, youngest son of the Norman conqueror, and all except two of these royal Harrys (Henry III and Henry VI) were among the ablest of the long line sovereigns of our island kingdom.

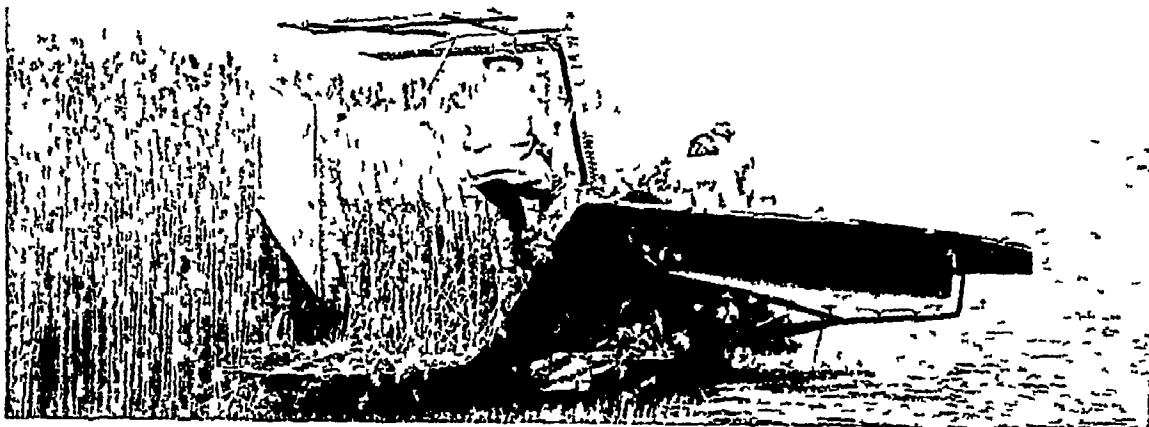
HENRY I, who reigned 1100–1135, was called "Beauclerc" because, unlike most princes of that age, he was a "good scholar." He is credited with saying that "an unlettered king is only a crowned ass." During the 35 years of his reign, England enjoyed peace and prosperity. The chronicler of those times wrote that he "was a good man and great was the awe of him, no man durst ill-treat another in his time."

At his accession Henry I issued a famous "Charter of Liberties," which became the basis of Magna Carta, the foundation of the liberties of the Anglo-Saxon world. He also favoured the Church in order to win its support against his elder brother Robert, who claimed the English throne in addition to the Duchy of Normandy, left him by their father.

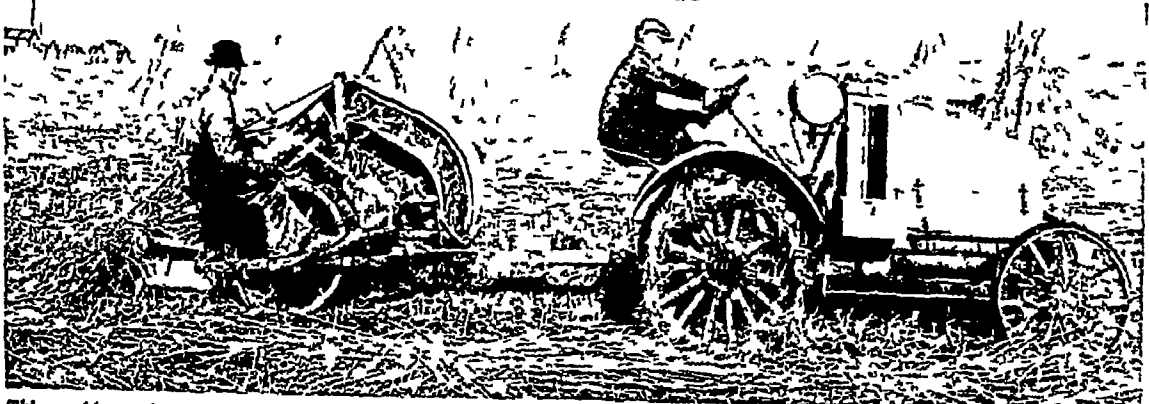
England was pleased by his marriage with Matilda, a descendant of the Anglo-Saxon kings, and the support of the common people was assured by his successful measures against the Norman nobles, and by the justice he administered through the "King's Court." The "Lion of Justice," he was called.

One misfortune darkened Henry's later years. His only son was drowned when the White Ship

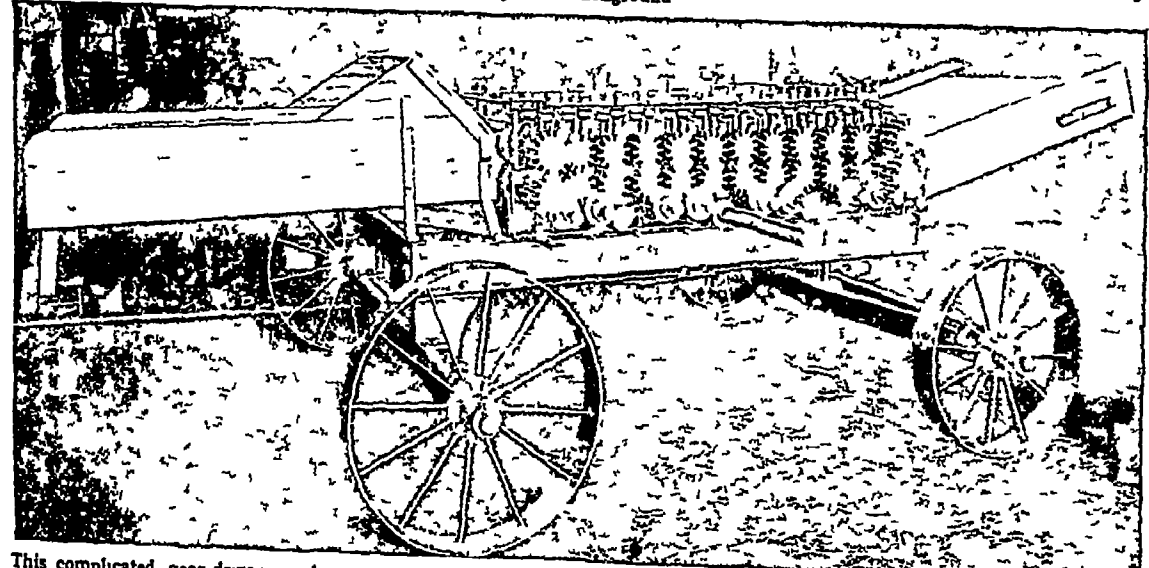
HARVESTING THE 'ROPE' CROP ON A HEMP FARM



The hemp harvesting machine cuts an even swath, passes the stalks up to the table on the right of the driver and from there distributes them over the ground in even windrows. They lie in this way on the ground until they have been "retted," that is, decayed by moisture and exposure so that the woody portions separate from the fibre.



This machine gathers the hemp stalks from the windrows and ties them into bundles ready to be shocked. Notice the shocks already set up in the background.



This complicated gear driven machine separates the hemp fibre from the woody portion of the stalks. The rollers of the machine are fluted so that they will crush the stalks properly as they pass through. Once crushed, the stalks pass on to the "scutcher" which combs out the fibre from the woody pulp.

HENRY

sank in the English Channel and, according to the story, the king "never smiled again" This accident left his daughter Matilda and his nephew, Stephen, contestants for the throne at his death (See Stephen, King of England)

HENRY II, (reigned 1154-1189), was the son of Matilda, and the grandson of Henry I His father was Geoffrey of Anjou, called "Plantagenet" from his habit of wearing a sprig of the broom plant (*planta genista*) in his cap, so with Henry II, in 1154, the first Plantagenet king ascended the English throne Two years before he became king, as a lad of 18, Henry had led an army from France to assert his mother's claim, and the wearied Stephen had agreed to a treaty by which Henry was recognized as his successor

Henry II was the most powerful prince in Christendom In addition to England and Normandy, which he held by his mother's right, he inherited from his father, as French fiefs, the important provinces of Anjou, Maine, and Touraine, and by his marriage with Eleanor of Aquitaine he acquired Poitou, Guienne, and Gascony, so that he held most of the British Isles and about one-half of France Frequent wars with his suzerain, the French king, followed in which some of Henry's nobles took part against him

Henry re-established law and order after the anarchy of Stephen's reign He improved the military service by permitting the barons to pay "scutage" or shield money in place of serving in the army, with this he hired soldiers who would fight whenever and wherever he wished—an important means of keeping in order the powerful nobles of the land His greatest work, however, was the reform of the law courts The Curia Regis was brought into every part of England by the sending of learned judges on circuit through the land to administer what was called the "king's justice," so that gradually one system of law took the place of the many previous local customs

He also established the "grand jury," by which accusations could be brought by a body of representatives of the community against evil-doers who were so powerful that no single individual dared accuse them To him, also, we owe the growth of the "petty" or "trial jury," especially in cases relating to land, this substituted the weighing of evidence, and testimony by sworn men, for the old superstitious trial by battle, or by ordeal (See Jury) Henry even attempted to bring churchmen who committed crimes under the king's courts, but the scandal caused by the murder of Archbishop Thomas Becket forced him to give up this reform (See Becket)

Henry's last years were embittered by the rebellion of his sons, aided by Philip Augustus of

France and by their mother, the unscrupulous Eleanor The king, old, sick, and discouraged, had to consent to the terms demanded of him When he saw the name of John, his favourite son, among those of his enemies, he exclaimed, "Now let all things go as they will, I care no more for myself, nor for the world" Two days later he died muttering, "Shame, shame on a conquered king"

HENRY III, (reigned 1216-1272), son of King John, was a religious man, and a good husband and father, but he was a weak and incompetent ruler Until he became of age, officers trained under his grandfather, Henry II, directed affairs, and good order and prosperity prevailed When Henry III took the administration into his own hands, he squandered the revenues of the kingdom on greedy relatives and favourites The nobles seized upon his misgovernment as an excuse for rebellion in the Barons' Wars, under the leadership of the great Simon de Montfort (See Montfort, Simon de) After Simon was defeated and slain in the battle of Evesham (1265), the people looked to the king's son, Edward, for good government, and during the last seven years of Henry's reign the country was quiet and flourishing

HENRY IV, (reigned 1399-1413), founder of the royal House of Lancaster landed in England from unjust exile with only 60 followers The 60 soon became 60,000, for all classes of people were tired of the mingled tyranny and weakness of Richard II, grandson and successor of Edward III, and he was deposed and imprisoned Henry IV, claiming descent "by right line of blood from the good King Henry III," was then seated on the throne by Parliament

Throughout his reign of 14 years his position was insecure and trying The claim later asserted by the House of York was felt to be a better hereditary title to the throne than that of Lancaster Scotland was restless, newly-conquered Wales broke into open revolt, and the powerful family of Percy took arms under the famous "Hotspur"

So Henry was obliged to keep on good terms with the Church, and to permit the newly arisen Parliament to exercise powers in the government of the country which became a notable precedent in later struggles between Crown and Parliament Shakespeare represents him as speaking these words on his death-bed

Heaven knows, my son,
By what by-paths, and indirect crook'd ways,
I met this crown, and I myself know well
How troublesome it sat upon my head,
To thee it shall descend with better quiet,
Better opinion, better confirmation,
For all the soil of the achievement goes
With me into the earth

HENRY V, (reigned 1413-1422), the former madcap "Prince Hal," of Falstaff's companion

HENRY II AND HENRY III CARVED IN STONE



Some of the Norman and Plantagenet kings were buried in England and some in France. The top photograph shows the tomb of Henry II in Fontevrault Abbey, western France. By his side sleeps Isabella, wife of his youngest son, John afterwards king of England. The lower photograph shows the tomb of Henry III in Edward the Confessor's Chapel in Westminster Abbey. His altar tomb rests on a pedestal and is surmounted by a gilt bronze effigy of the king. He is wearing his coronation robes and a simple crown. The hand, now empty, probably once held the sceptre.

Photos: Doreau Rouen and Royal Commission on Historical Monuments in London

ship, in Shakespeare's scenes—proved the hero-king of England. As king he "put away childish things," and was sober, clear-headed and vigorous, so that he acquired the reputation of being "the most virtuous and prudent of all the princes reigning in his time." He followed his father's advice to "busy giddy mounds with foreign quarrels" by putting forth again the claim to the French throne, formerly raised by Edward III, thereby renewing the Hundred Years' War (*See Hundred Years' War*). By his brilliant victory at Agincourt (1415) he conquered all the northern half of France, and by a treaty five years later he married Princess Catherine of France, it was also agreed that he should become King of France after the death of Catherine's father, the insane Charles VI. In the midst of his victories, Henry V died of camp fever at Vincennes, leaving as heir to his rights in both kingdoms his infant son Henry, nine months old.

HENRY VI, (reigned 1422–1471), was one of the most unfortunate kings who ever sat on a throne. While he was still a baby his uncle, the Duke of Bedford, ruled for him, and for a time maintained and even extended the English conquests on the Continent. Then the French were aroused by Joan of Arc, who raised the siege of Orleans and brought the young French king, Charles VII, to Reims to be crowned (*See Joan of Arc*).

Matters did not mend for the English when Henry VI grew to manhood. He was truthful, upright and just, but he had the strength neither of mind nor body to rule a kingdom, and for long periods he was insane like his French grandfather. War and business were never to his liking, he would rather have lived the life of a monk. So, bit by bit, the English lost the lands which they held in France, until only the city of Calais was left to them when the long Hundred Years' War ended, in 1453.

Meantime, the misgovernment of Henry's ministers at home led to a rebellion under Jack Cade, in 1450, in which London was taken before the insurgents were overpowered, and their leaders executed. Five years later began the merciless Wars of the Roses. In these Queen Margaret, Henry's French wife, was the real head of the Lancastrian party, and King Henry played only a feeble part. But in the course of the contest he lost his throne to the Yorkists, his young son Prince Edward was slain, and the king himself was finally imprisoned in the Tower of London, where he was eventually murdered (*See Roses, Wars of the*).

HENRY VII, (reigned 1485–1509), who claimed descent from the Lancastrian House, gained the throne by overthrowing the last of the Yorkists. When the battered crown of the usurper Richard III was picked up on Bosworth Field and placed

on the head of Henry Tudor, the seventh Henry, the Wars of the Roses ended, and with them the Middle Ages in England. He was the first modern king of our land. He united the Houses of Lancaster and York by marrying Elizabeth of York, niece of Richard III. War had no place in the policy of this Tudor king, who was called the "Solomon of England," and was regarded by his subjects as the craftiest and stingiest prince of his time.

Abroad, he secured his aims by treaties and by the marriage alliances of his children. At home he increased his power by forbidding the great nobles to maintain lawless bands of followers, and by compelling them to obey the laws by means of his famous Court of Star Chamber. He thus laid the basis of that powerful Tudor monarchy, as it came to his son, Henry VIII, and the great Elizabeth.

Henry VII is also to be remembered because in his time the Renaissance (*see Renaissance*) was established in England. William Caxton had introduced printing into England shortly before this, and it was John Cabot, sailing by permission of Henry VII, who laid the foundation for England's claim to Newfoundland and the mainland of North America.

HENRY VIII, (reigned 1509–1547), was educated in the New Learning, and—before the death of his elder brother, Arthur, made him heir to the throne—was intended for a career in the Church. He was a clever, gay and handsome youth, well skilled in all manner of athletic games, though in later life he became coarse, fat and ungainly. For nearly 40 years he ruled England with a strong hand, and brought about one of the most far-reaching changes ever effected in the institutions of any kingdom. For motives of policy he was betrothed to his brother's girl-widow, Catherine of Aragon.

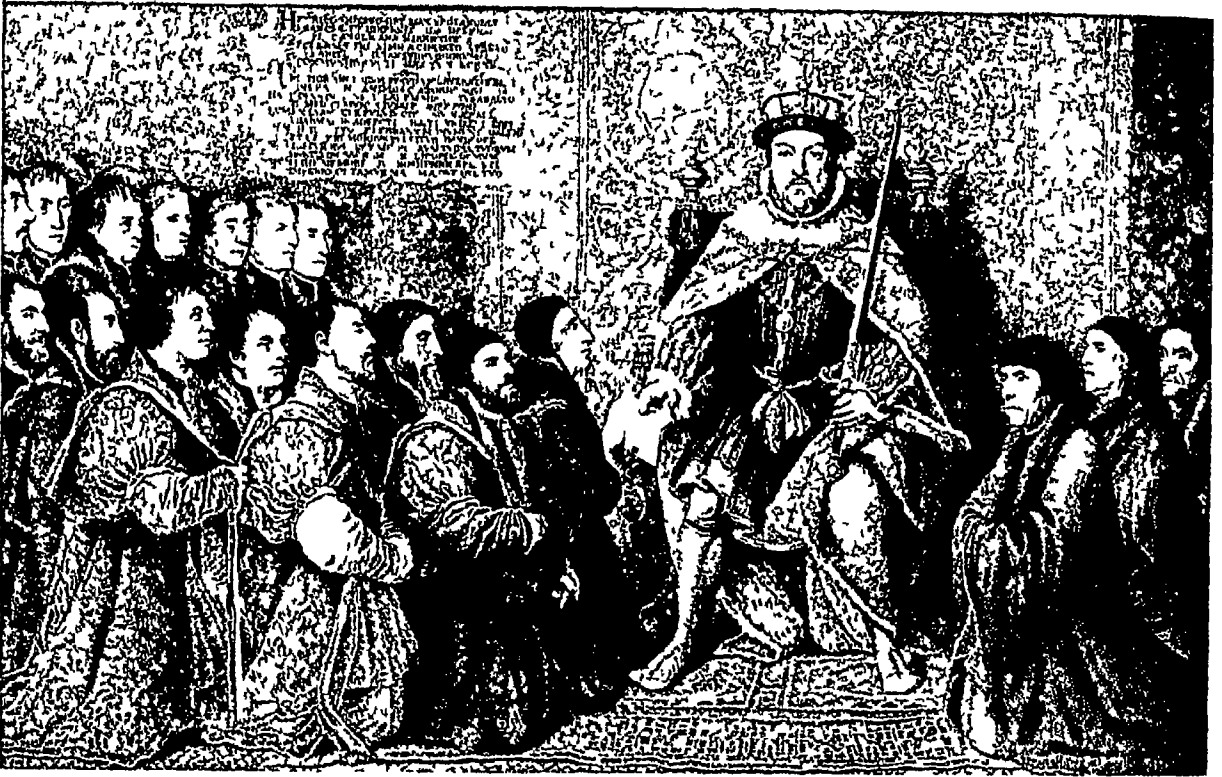
During the first 20 years of his reign he left the shaping of policies largely in the hands of his great counsellor, Cardinal Wolsey, who sought to give England importance by acting as an arbiter between warring Spain and France. On one occasion Henry took part in France in the gorgeous display of the "Field of the Cloth of Gold," where he and the young French king, Francis I, met to wrestle, dance, watch tournaments, and talk of international relations and policies.

At the end of this period, Henry professed doubts as to the power of the Pope to grant him the "dispensation" which the laws of the Church had required in order that he might marry his brother's widow. Perhaps these doubts were strengthened by the fact that the only one of Queen Catherine's children to live was a sickly girl—the Princess Mary—and it was doubtful whether a woman could succeed

FOUR OF ENGLAND'S EIGHT KING HENRYS



From 1399 until 1471 England was ruled by three Henrys, father, son, and grandson. The illustration, top left, shows the coronation of Henry IV in Westminster Abbey on October 23, 1399. It is taken from the Froissart MS in the British Museum. At top right is the marriage of Henry V to Catherine of Valois at Troyes, in 1420. This illustration is from a picture by William Kent, in Hampton Court Palace. Below left, a contemporary portrait of Henry VI by an unknown artist; right, a head and shoulders of Henry VII painted about four years before his death. The two latter portraits are now in the National Portrait Gallery, London.



HENRY VIII AND THE BARBER-SURGEONS

In spite of his many great faults King Henry VIII was not only a great king but a man of unusual intellectual power. He was an accomplished musician and the patron of learned men. The Company of Barber-Surgeons owes its charter to him, and in this contemporary painting he is seen presenting to the kneeling barbers the charter that united their company with the surgeons. It enacted that the barbers should confine their surgical practice to drawing teeth and letting blood, while the

surgeons were forbidden to cut hair or shave beards.

After Holbein from the painting now in the Barber-Surgeons Hall

to the English throne. Then, too, Henry had grown tired of Catherine and had fallen in love with a young court lady, named Anne Boleyn.

When the Pope would not annul his marriage, Henry in furious anger turned against his faithful minister Wolsey, deprived him of his office of Chancellor, and had him arrested on a charge of treason. (See Wolsey, Cardinal) He then obtained a divorce through Thomas Cranmer, whom he appointed Archbishop of Canterbury for the purpose, and it was soon announced that he had married Anne Boleyn. The Pope was thus defied. All ties that bound the English Church to Rome were broken. Appeals to the Pope's Court were forbidden, all payments to Rome were stopped, and the Pope's authority in England was abolished.

By an Act of Parliament, Henry himself was declared "Supreme Head of the Church of England," and to deny this title was made an act of treason. Some changes were also made in the Church services, the Bible was translated into English and copies were placed in the churches. The monasteries throughout England were dissolved, and their vast lands and goods turned over to the king, who in turn granted those estates to noblemen who would support his policies. Soon, in the northern part of the kingdom, the people rose in rebellion in behalf of the monks, but their "Pilgrimage of Grace"

was put down with extreme cruelty, and Henry proceeded still more eagerly with the abolition of the monasteries.

Although Henry reformed the government of the Church, he refused to allow any changes to be made in its doctrines. Before his divorce he had opposed the teachings of Luther in a book which had gained for him from the Pope the title "Defender of the Faith"—a title British kings still bear. And after the separation from Rome he persecuted with equal severity the Catholics who adhered to Rome, and the Protestants who rejected its doctrines.

He put to death every possible claimant to his throne. Among his other victims was Sir Thomas More, author of "Utopia."

Anne Boleyn, his second wife, he had executed, and Jane Seymour, his third wife, died in a little more than a year. Anne of Cleves he divorced, Catherine Howard was executed, but Catherine Parr, his sixth wife, survived him.

Henry. **KINGS OF FRANCE** The name of Henry has been borne by four kings of France, and of these the last was the greatest. HENRY I (ruled 1031-1060) was defeated by William, later the Conqueror of England, when he attempted to assert his authority over the Duchy of Normandy.

Under HENRY II (ruled 1154-1189) began the religious persecution of the Huguenots, which laid the train for the religious wars after

HENRY

his death. He died in a tournament, when a splinter from a lance entered the eye hole of his helmet and penetrated to his brain, in this, Protestants saw the hand of Providence. **HENRY III** (king 1574-1589) was the last of the three weak sons of Henry II and Catherine de' Medici.

HENRY IV, King of France and Navarre, who reigned from 1589 to 1610, was the last and greatest of the Henrys. He was king, not only of France, but also of the small independent kingdom of Navarre, on the northern slope of the Pyrenees. In 1569, when he was 16 years old, his mother, Jeanne d'Albret, the Huguenot Queen of Navarre, placed him in the care of Admiral Coligny, the brave Huguenot leader (See Coligny, Gaspard de). From that time until his accession as king of France, Henry of Navarre was the recognized leader of the Huguenot party, but for a short time after his marriage to the king's sister, Margaret of Valois, and the subsequent massacre of St. Bartholomew's Day, he seemed to renounce the Protestant faith in his easy-going way.

At the death of Henry III, in 1589, Henry of Navarre was the heir to the throne of France. But his right of succession was disputed by the powerful Catholic League, aided by the King of Spain, and he was not crowned until he had enforced his claim by arms and had become a member of the Catholic Church. The victory was practically won at the battle of Ivry, in

1590, which Macaulay has rendered famous by his poem of that name, beginning—
Now glory to the Lord of Hosts, from whom all glories are!

And glory to our Sovereign Liege, King Henry of Navarre!

Henry IV also set about restoring the prosperity of the land. The improvement in the condition of the people, in which he was aided by his great minister the Duke of Sully, and the agreeable personality of Henry IV, the first of the Bourbon kings, combined to render him the most popular king France has ever had. He was struck down by the dagger of a religious assassin, leaving the throne to his son, Louis.

Although he conformed to the Catholic Church, Henry IV did not forget the claims of his former religious associates. The Edict of Nantes, which he issued in 1598, gave the Huguenots equal political rights with Catholics, freedom of private worship in their own homes, and public worship in certain places (not including the king's court or within five leagues of Paris), and the government of La Rochelle and a few other strong places as "cities of refuge." This edict remained in force, with some modifications, for nearly a hundred years.

HENRY THE NAVIGATOR (1394-1460). A famous figure in the history of exploration was the fifth son of John I, King of Portugal, and of Philippa, daughter of the English John of Gaunt, who became known as Henry the Navigator.



PARIS ACKNOWLEDGES HENRY IV OF FRANCE

This painting by Gerard, now at Versailles, shows the triumphal entry of one of France's greatest kings, Henry IV, into Paris in 1594. The assassination of Henry III in 1589 had left Henry of Navarre as king but it took ten weary years of struggle before he became undisputed ruler of his country. He adopted the Catholic religion in 1593 and this more than anything gained him support. At his assassination 17 years after he was mourned as the father of his people.

Photo. Alinari

in honour of the discoveries he inspired. He early distinguished himself at the conquest of Ceuta, the "African Gibraltar," in 1415. Soon afterwards he moved to Sagres, a town close to Cape St. Vincent, where he resided for a great part of his life.

While warring against the Moors of Africa, he became greatly interested in this mighty continent, and longed for a better knowledge of the western ocean and the discovery of unknown regions. He founded an observatory and also a school where young men could learn navigation.



THE NAVIGATOR

Henry the Navigator inspired Portugal's great sailors in their voyages of discovery. He himself went only on one or two.
From Major "Prince Henry"

Then he began sending out expeditions. One by one the rich islands of the Azores, Madeira, the Canaries, and Cape Verde were discovered, and the African coast was explored as far as Sierra Leone. "Explore, trade, convert!" said Prince Henry to his men. All this they did, and—less happily—began trading in captured African slaves.

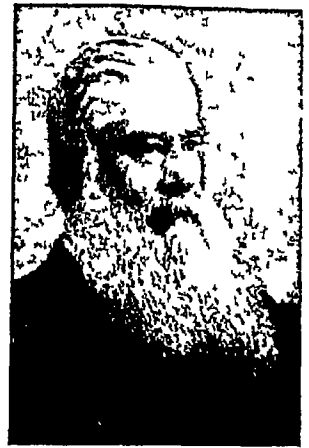
Prince Henry died before the full results of his work were seen.

These results, which made people at last realize that the oceans were not great lakes in a world of land, were credited to others. But the real master of the bold sailors who discovered America, rounded the Cape of Good Hope, reached India, and finally encircled the globe, was Henry the Navigator.

Henty, GEORGE ALFRED (1832-1902) How many of the writers of thrilling books for boys have actually experienced any of the adventures told in their pages? This is a question you may well ask yourself, but in one case, at least, a large proportion of the adventures described were from first-hand knowledge. G. A. Henty, who in the last quarter of the 19th century was without a doubt the chief writer in this field, had a most varied and exciting career.

Henty, who was born near Cambridge, December 8, 1832, started his active existence as a volunteer at the Crimea, and almost immediately became a journalist as well, for he reported the operations at Sebastopol for one of the great London newspapers. Thereafter he served elsewhere in Europe, for the Italians against Austria, both in an organizing and a journalistic capacity, as manager of a mine in Wales, and in almost every European war that occurred between 1859 and 1876. He also "covered" many important events in all parts of the world for various newspapers.

By the time he was 45, in fact, Henty had accumulated enough experiences to enable him to settle down and turn out, at the rate of three or four every year, those books for which he was to become famous. "With Clive in India", "The Lion of the North: a Tale of Gustavus Adolphus", "Redskin and Cowboy", "In the Reign of Terror"—just these four are enough to give you some idea of the range he covered.



G. A. HENTY

Henty was a prolific writer of boys' books, and, though he died in 1902, his thrilling stories still have a wide popularity.

Elliott & Fry

Henty, moreover, unlike many writers, looked the part of one of his own genial adventurers, for he was tall and handsome, with a magnificent beard and burly figure. Even in his leisure, too, he showed his spirit, for he was a pioneer in the then young sport of ocean-racing, sailing in his own yacht. It was on this yacht, fittingly enough, that he died on November 16, 1902, in Weymouth harbour.

Hephaestus. (Pron *hē-fēs'-tus*) The lame god Hephaestus (Roman Vulcan), the son of Zeus and Hera, was the god of fire and the forge. He was lame from birth, according to some stories, but others assert that he was crippled by being hurled down to earth by Zeus, falling on the island of Lemnos, where he built a palace, with a workshop and anvil. He also had a beautiful palace in Olympus, or, according to others, under Mount Etna, on the island of Sicily. Here with the help of the Cyclopes, the one-eyed giants, he made the thunderbolts of Zeus, the armour of Achilles, and the weapons of Hercules. He was also aided by handmaidens whom he had made of gold and endowed with life. All the palaces of Olympus were built by him. In the Homeric poems, the kind-hearted but limping god is represented as a comic figure whose deformity provokes "inextinguishable laughter" in the other gods. He was the patron deity of the metal-workers.

Hera. By the side of Zeus on Mount Olympus, as the Greeks believed, reigned his stately wife Hera (called by the Romans Juno), queen of the gods. Their life was not always one of harmony, however, for Hera was quick to anger and Zeus frequently gave cause for jealousy. Hera was the goddess of womanhood, of marriage, and of maternity. The peacock, the cuckoo, and the pomegranate were sacred to her. She was usually represented as a

beautiful, majestic woman of mature age, with large wide open eyes and grave expression inspiring reverence. Homer speaks of her as the "white armed goddess" and the "ox-eyed queen." The most famous statue of Hera was the one by Polyclitus in the temple of Argos. This was a colossal image, in ivory and gold, representing the goddess seated on her throne, wearing a crown and bearing in one hand a pomegranate and in the other a sceptre with a cuckoo placed at its summit.

Heraldry. In the Middle Ages, when knights wore armour that completely covered their heads and bodies, there grew up the custom of emblazoning devices on shields and surcoats so that the wearers could be distinguished on the field of battle.

By slow degrees an elaborate science of heraldry developed. Strict rules were laid down regulating the assumption and design of armorial bearings, and colleges of heralds were founded to enforce observance of the rules. Most of the terms used in heraldry are French, because that language prevailed while the science was growing up.

Several coats of arms are often arranged, or "marshalled," on the same shield, or "escutcheon," to show descent, marriage, alliance, etc. To enable this to be done, the shield is divided into halves by a single line extending across it vertically, diagonally, or horizontally, or it is divided into "quarters" by a cross shaped arrangement of lines, and these quarters may be further subdivided. The metals and colours are called or (gold), argent (silver), gules (red), azure (blue), sable (black), vert (green), purpure (purple), sanguine (dark red).

The "charges" or devices are of infinite variety. Some are wide bands, variously named according to the direction in which they cross the shield. Thus the "pale" extends from top to bottom, the "fess" is a horizontal band in the middle, and the "bend" crosses diagonally from the upper left hand corner (*dexter chief*) to the lower right-hand corner (*sinister base*).

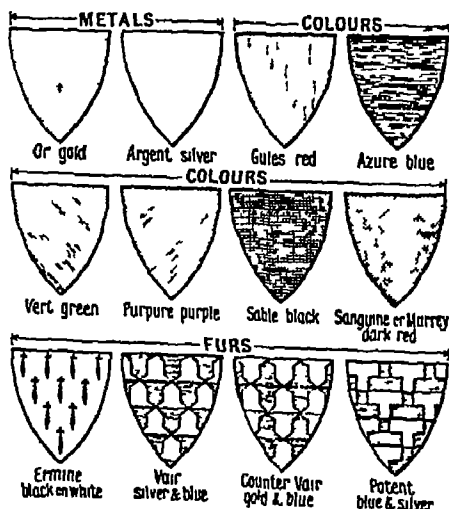
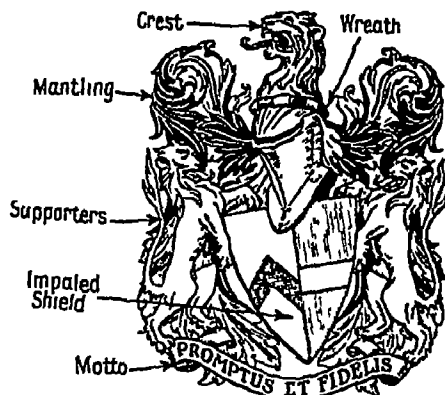
Other common charges are simple geometrical designs,



HERA AND ZEUS

E.N.A.

This sculpture shows Hera and Zeus on Mount Ida in one of their less quarrelsome moments. It is a part of a frieze dating probably from the 5th century, now in the Palermo Museum.

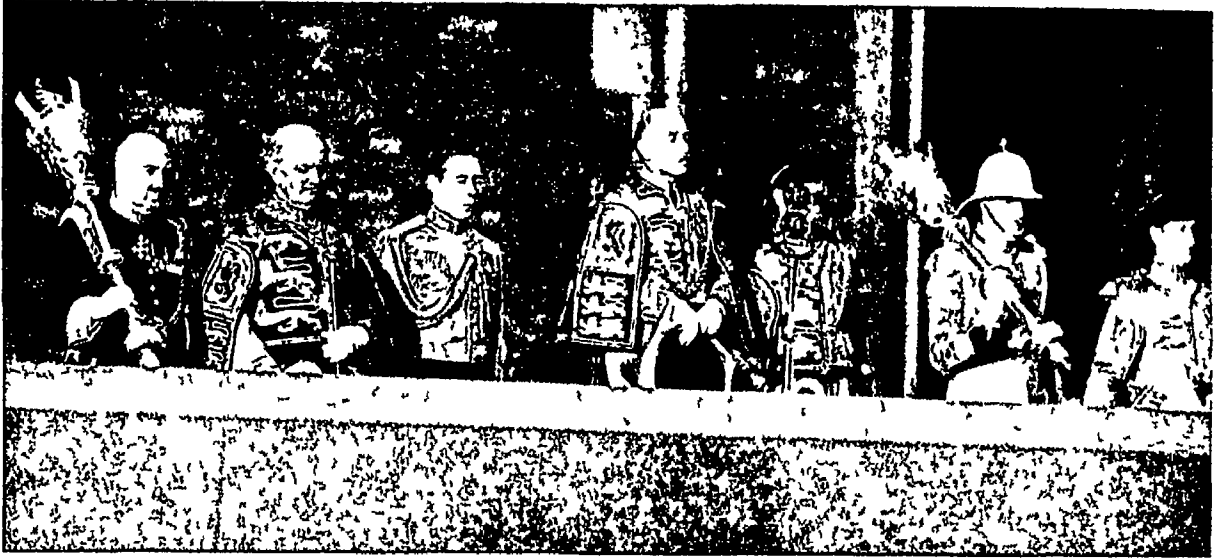


HERALDIC DEVICES

Top, imaginary armorial achievement showing the method of impaling a man's arms (chevron) with those of his wife (bar or fess). Below tinctures, or methods of indicating metals, principal colours, and furs.

and others are representations of animals, flowers, trees, leaves, etc. The animal most frequently used in heraldry is the lion, which may be placed in several positions: *rampant* (erect on the hind legs), *passant* (walking), *couchant* (lying with the head raised), *dormant* (asleep), etc. (See page of Heraldry in Fact-Index).

Grants of coats of arms to those entitled to bear them are made by the College of Arms. It is composed of three Kings of Arms (Garter, Clarenceux and Norroy), six heralds (Windsor, Chester, Lancaster, York, Richmond and Somerset), four pursuivants (Rouge Croix, Bluemantle, Rouge Dragon and Portcullis), and two extra heralds. They are appointed by the Earl Marshal, and their duties, in addition to the granting of arms, are to proclaim the accession of the Sovereign, to make proclamations on other important occasions, to attend the Sovereign in the House of Lords, to attend the installation of Knights of the Garter and to marshal processions.



THE HERALDS PROCLAIM KING GEORGE VI

This photograph shows the proclamation of King George VI at St James's Palace on December 12, 1936. Between the mace bearers, left to right, are Clarenceux King of Arms, the Earl Marshal, Garter King of Arms, who read the proclamation, and Norroy King of Arms. At Trafalgar Square the proclamation was made by Lancaster Herald, at Temple Bar by Norroy King of Arms, and from the steps of the Royal Exchange by Clarenceux King of Arms. It is only at the proclamation of a sovereign, at a Coronation and at a State opening of Parliament, that the Kings of Arms and Heralds wear their tabards.

The head of the College of Arms is the Earl Marshal, who nominates the members. The college was established and endowed by Richard III in 1483, and it now occupies a building in Queen Victoria Street in the City of London, built about 1669 by Sir Christopher Wren.

Hercules. (Pron *hēr'-kū-lēz*) By far the most celebrated of the Greek mythical heroes was the mighty Hercules (or Heracles, as the Greeks called him), the son of the great god Zeus and the mortal Alcmena. The goddess Hera (Juno) was hostile to Hercules from his birth, and sent two serpents to destroy him in his cradle, but the infant strangled them with his hands. As he grew up, Hercules was trained by Autolycus in wrestling, by Amphitryon in driving a chariot, and in other manly accomplishments by famous heroes.

Obtaining in marriage Megara, daughter of the king of Thebes, as reward for having slain Erginus, king of Orchomenus, the oppressor of the Thebans, he had by her several children. But in a fit of madness, sent by his old enemy Hera, he slew the children. Then, the myth goes on, he purified himself of this deed by a journey to the Delphic oracle, which instructed him to serve Eurystheus, the king of Tiryns, for twelve years. Eurystheus compelled him to perform the "twelve labours", this term, or the phrase "Herculean task," has ever since been used to describe any task of extreme difficulty.

The first labour was the slaying of the Nemean lion, a monstrous beast that terrified the country of Nemea. Hercules, at the command of Eurystheus, strangled the animal with his own hands.

Next he slew the Hydra, a terrible nine-headed water serpent. As soon as he crushed one of

the monster's heads with his club, two more grew in its place, but finally, with the help of a friend who seared each neck with a blazing branch, Hercules succeeded in killing the Hydra. He then dipped his arrows in its poison.

His third task was to capture and bring alive to Eurystheus the Arcadian stag, an animal with golden horns and brazen hoofs, so fleet of foot that it scarcely touched the ground. The capture of the wild Erymanthian boar was the fourth labour. When Hercules returned from the chase with the huge beast on his shoulders, Eurystheus took fright and hid in a tub. A greater task was the fifth, the cleansing of the Augean stables. Augeas, king of Elis, had a herd of 3,000 oxen, whose stalls had not been cleansed for 30 years. By turning the rivers Alpheus and Peneus through the stables, Hercules finished the work in a single day.

As the sixth and seventh labours, he killed with his poisoned arrows the monster Stymphalian birds, which fed on human flesh, and captured the Cretan bull. This bull had been sent by Poseidon (Neptune) for Minos, king of Crete, to sacrifice. But Minos was so pleased with the beauty of the animal that he kept it for his own, whereupon Poseidon drove the bull mad and it caused great damage. Next came the capture of the mares of Diomedes, the Thracian king, which ate human flesh. Hercules killed Diomedes and threw his body to the horses, before bringing them to Eurystheus.

Hercules was then dispatched to obtain the beautiful girdle of Hippolyte, queen of the Amazons. The hero defeated the warrior-women, killed the queen, and escaped with the girdle. The tenth labour was the capture of the

HERCULES FIGHTS THE HYDRA WITH HIS CLUB



In the realm of ancient Greek myth one of the most prominent characters is the "strong man" Hercules. When he was instructed by the Delphic Oracle to go to Tiryns and serve King Eurystheus for twelve years Hercules was set "twelve labours" to perform. His second task was to slay the Hydra, a nine-headed monster which dwelt in a swamp near Lerna. As soon as Hercules struck off one of the monster's heads with his club two others grew in its place. Hercules eventually conquered the monster with the help of his friend Iolaus who seared the wounds with a burning torch and buried the last head which was supposed to be immortal. The illustration is from a 17th-century engraving by Bernard Picart.

HERCULES

oxen of Geryon, a monster with three bodies, who dwelt on the fabulous island of Erythia, beyond the strait of Gibraltar. On his journey the hero erected the famous rocks on either side of the strait, known as the "Pillars of Hercules."

The eleventh exploit was to obtain the golden apples of the Hesperides, which Gaea, or Mother Earth, had presented to the goddess Hera as a wedding gift. Hercules succeeded through the help of the Titan Atlas, father of the Hesperides, the four sister-nymphs who guarded the apples with the help of a sleepless dragon. Atlas, whose task it was to support the weight of the heavens on his shoulders, went to get the apples, while Hercules relieved him of his burden. While engaged in this labour, the hero encountered some other strange adventures, for on the way he met the tiny race of men called Pygmies, and slew the giant Antaeus, son of Poseidon and Gaea, who compelled all strangers coming into his country to wrestle with him, on condition that if he conquered they would suffer death. He also set free Prometheus, who had been chained to a rock in the Caucasus for stealing fire from the gods and giving it to mortals.

The last labour was bringing Cerberus up from the lower world. Braving the dread regions of Hades, he captured this many-headed dog, who guarded the entrance, and brought him before Eurystheus, who was so terrified that Hercules had to take back the monster.

Having finished his appointed tasks, Hercules was now freed from bondage. But these were not the only feats he performed. He gave way to violence at times, and once, in a fit of rage, slew

his friend Iphitus, but, for the most part, his strength was used to relieve those who suffered pain or oppression. For example, he brought back from the grave the noble Alcestis, who had given her life for her husband.

As the life of Hercules was a hard one, so also was the manner of his death. With his wife Deianira he came to the bank of a river across

which travellers were carried by the centaur Nessus. Hercules waded across the stream, while Nessus carried Deianira. But when the centaur attempted to run away with Deianira, Hercules shot him with one of his poisoned arrows. The dying Nessus called to Deianira to take some of his blood and keep it as a charm to preserve the love of her husband.

Before long, Deianira, fearing that Hercules was in love with another woman, sent him a robe which she had steeped in the blood of Nessus. No sooner had he put on the robe than poison spread through his body like fire, and caused him such agony that, fleeing to Mount Oeta, he built a funeral pyre on which he threw himself to die. But as the flames consumed his body, Zeus caught up the immortal part and bore it to Mount Olympus, where, purged of mortal sin and sorrow, Hercules dwelt among the gods in eternal happiness.

Hercules has been a favourite character in literature, and his heroic strength has inspired many beautiful works of art. The finest representation of the hero in sculpture is the Farnese Hercules. Festivals were celebrated in honour of Hercules, at which his exploits were sung in long poems called *Heracleia*.



HERCULES PORTRAYED IN MARBLE

This hero of Greek mythology has remained until today the embodiment of an ideal of physical strength, and "herculean" has become an accepted adjective for muscular power and prodigious tasks. This photograph shows the most famous statue of Hercules, it is known as the "Farnese Hercules," and is in Naples Museum.

LINKS in the CHAIN of LIFE

The science of heredity is entirely of modern origin, but already its implications have revolutionized our ideas of breeding animals and men, and have even affected our ideas of education. What is inherited and how are told here

Heredity. The saying, "Like begets like," expresses essentially the general fact of heredity, the universal law among all kinds of living things, both animals and plants. That it is so is a matter of observation by anyone with sharp eyes, keen wits, and a mind open to even the simplest things found in all of the common forms of life. An acorn grows into the giant oak and not into the peach tree, and a hen's egg hatches into a chick and not into a duckling.

But it is the outside or superficial things that most of us see, and we are apt to forget the vast multitude of more deep seated resemblances between parent and offspring, many of them inside an animal or plant. The parents are tall, have dark hair and eyes, the child will be tall, have dark hair and eyes. But think a moment of the deeper things. The parents have three jointed fingers and toes, eyelids, valves in the heart, muscles and bones, many nerves always supplying the same parts of the body—and a thousand and one other things. So the child gets all these in proper form from his parents—a miracle, and almost always unthought of! It is only when the child is not quite normal that people are apt to think of the unusual thing, though the usual thing is the more wonderful. How amazingly delicate and minute inheritance is, may be observed by anyone among any kind of pure bred domestic animals or plants or almost any in Nature. And yet we should really say that "like begets almost like", for the likeness of parents to off-spring is never complete.

How We Resemble Our Fathers

The resemblance of child to parents is not limited to the structures of the body. The parent is keen, aggressive, resourceful, has a good memory—a thousand and one things that make for "personality". And the child inherits a number of these mental attributes from its parentage. In many cases, of course, it is a matter of common observation that the resemblance has come from the grandparents, or even more remote ancestors. In such cases, naturally, the traits have lain dormant in one or more generations. Sir Francis Galton, the great English student of many human phenomena, stated this fact in the general law that children resemble their parents about half, grandparents about a quarter, great-grandparents about an eighth, etc. In recent years the tendency has been to place the proportion derived from the parents at a somewhat higher figure.

We can start looking into the whys and wherefores of heredity with something we all know—a hen's egg. As formed in the hen, the egg is a single cell, containing a bit of living protoplasm with a nucleus (see Cell), yellow food matter called *yolk*, and a layer of white albuminous matter, within a protecting shell. Such an egg is *infertile* and will not hatch.

But suppose a germ cell contributed by the male parent finds its way inside the mother's body to the egg before the shell is formed, and fuses with the nucleus, as shown in the picture in page 2075. Now the egg is *fertile*. The cells from each parent, fused into one, will divide and redivide by the process called *mitosis*, until they have formed a living chick. (For picture, see under Biology, page 501.)

Growth by Division of a Single Cell

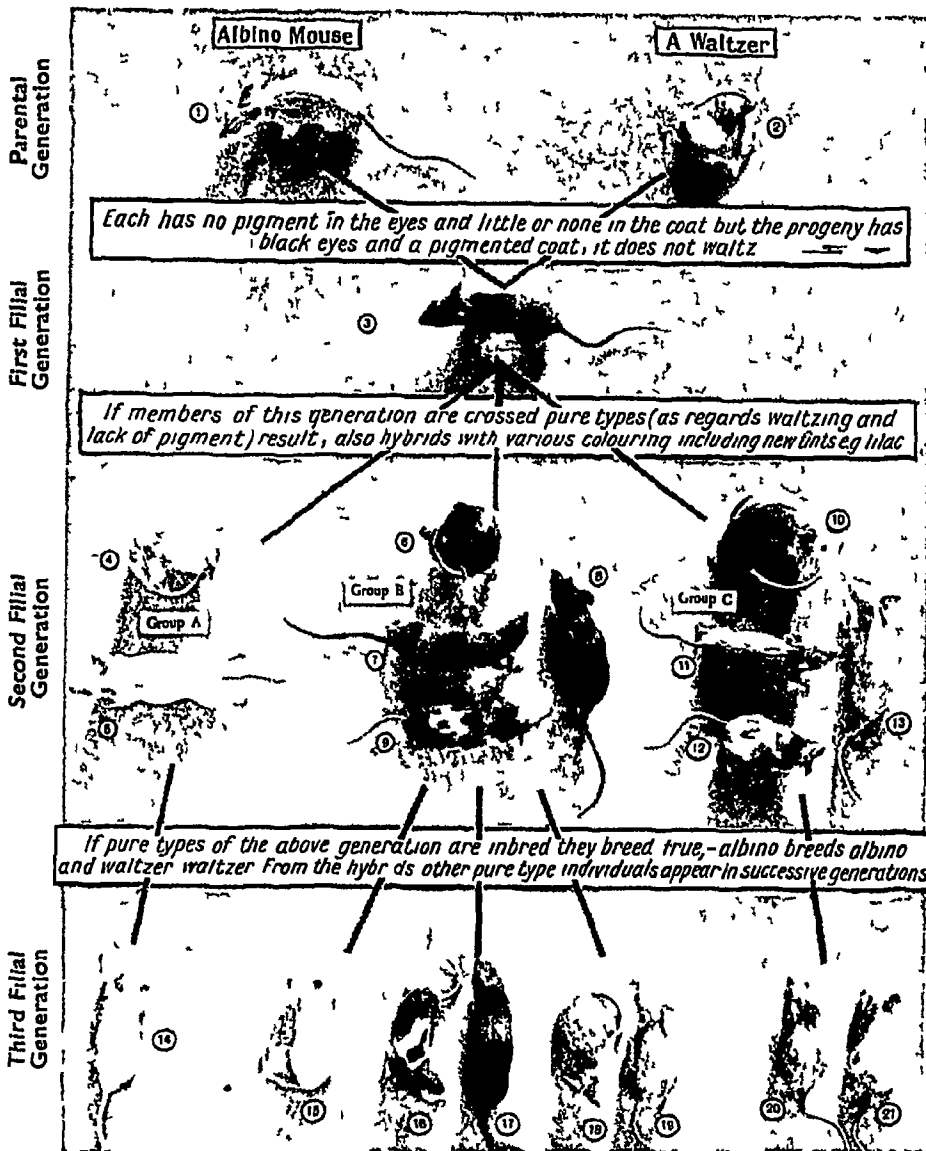
Mitosis or cell division is controlled in every cell by threads of matter called *chromatin*, within the cell nucleus. Before division occurs, the chromatin forms itself into rods called *chromosomes*. The number formed depends upon the species of living being, and within every cell in any individual of a species the number is always the same. Then the chromosomes split lengthwise, and one-half goes to each of the new cells.

In this simple type of division, the two new cells always resemble the old one. Such divisions replace all cells in ordinary or *somatic* tissues, and supply additional cells for growth. But the fertilized cell formed by the union of two parent cells must divide and redivide, in such a way as to produce all the tissues needed by the new living body. Also, this fertilized cell is formed by the *union* of two parent cells, so if each parent cell had the usual amount of chromatin, the fertilized cell would have too much.

Germ cells, therefore, undergo more complicated changes than somatic cells, but science has managed to discover much of what happens. The chromatin in germ cells is adjusted to the right amount when the cells form. A special type of "reduction" division gives each germ cell, father and mother, only half the usual number of chromosomes. Such a specialized germ cell is called a *gamete*, or *pronucleus*. Union of two gametes, therefore, gives the fertilized cell the right number of chromosomes once more.

In recent years, students of heredity, especially T. H. Morgan, have discovered much about how germ cells carry heredity. They have learned

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MENDEL'S THEORY OF HEREDITY PROVED BY MICE

An albino mouse (1), without pigment in eyes or coat, is crossed with a waltzer (2) with only slight pigment in coat and with the peculiarity of constantly turning round as if after its tail. The progeny (3) exhibit pigment and do not waltz. If a male and female of this generation are mated their progeny show the differences in colour and mode of progression of groups A, B and C. In the third filial generation (14) is a pure albino, from group B are derived light-coloured individuals (15), (18), (19), from group C colours are carried forward.

Courtesy of the Director Natural History Museum South Kensington

that heredity is carried by particles called *genes*, which we may liken to beads on a string, in the chromosomes. Each gene is believed to exercise some chemical or other influence on one or more bodily processes, in some cases, several co-operate to direct a process, such as colouring an eye. Since chromosomes may come from either parent, and each may contain thousands of genes, there are genes enough to explain the inheritance of all the features, physical and mental, of the parents.

Even more wonderful is the explanation of inheritance from grandparents and remote ancestors. In every new living body, some of the earliest divisions made by the fertilized germ cell result in material being set aside to form germ cells for that body when its time comes to

reproduce. Thus the heritage of genes, often called "continuity of germ plasm," which shapes physical life, passes on unbroken from generation to generation. Germ cells can be immortal, so long as they are passed on to new individuals. Every living being contains an unbroken inheritance from its very first ancestors. It is, as it were, the focal point of long ancestral lines stretching back to the dim past, each contributing to the new image formed.

Usually genes from each parent join "pair and pair alike" along each chromosome. When chromosomes "exchange" portions of their length before joining, they have "crossed over," and the heritage given the new living being is affected.

The discovery of genes has merely given a clue to the secret of heredity—but the clue is a fruitful one. The first discoveries were made by studying fruit flies (*Drosophila*), which breed rapidly and thus reveal quickly the result of any change detected in genes, besides having certain other advantages from

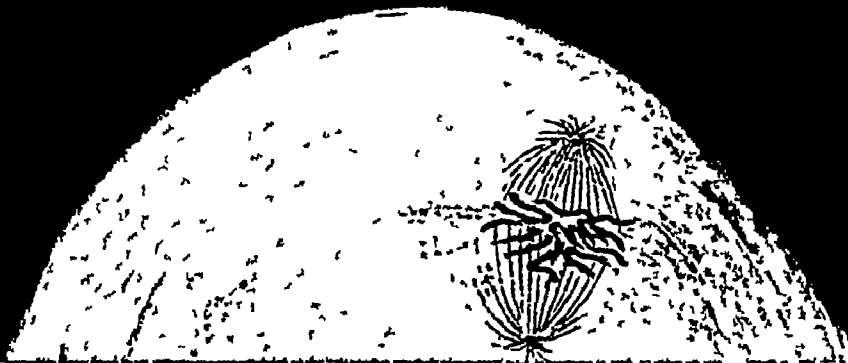
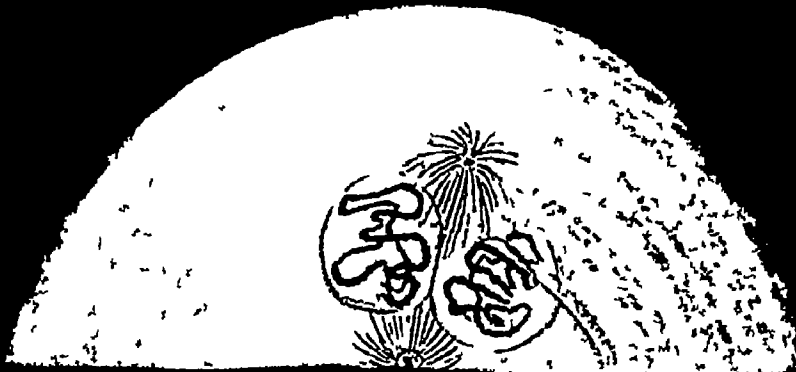
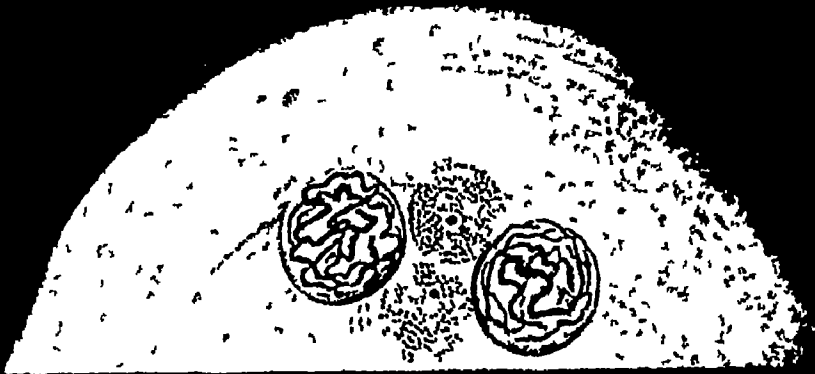
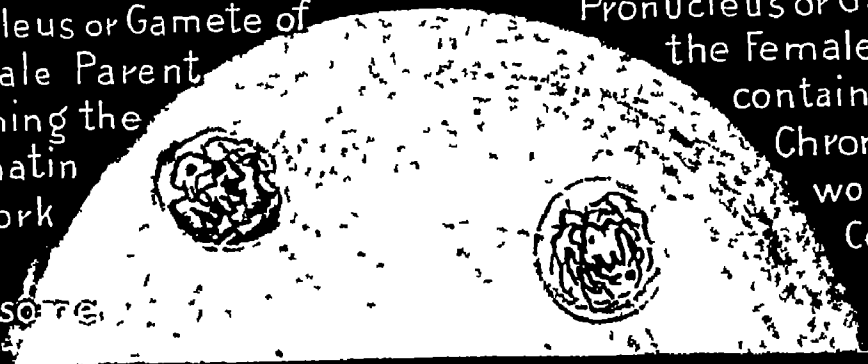
the investigator's point of view. Scientists now treat genes with X-rays, chemicals, and other influences, and can detect resulting changes in the flies. Such methods are rapidly contributing to our knowledge of the problems of heredity.

Before genes were discovered, men had learned how heredity works out in many cases, without knowing why. The outstanding worker in studying heredity was an Austrian monk, Gregor Johann Mendel (1822–1884), who published his discoveries in 1866, although the importance of his work was not recognized till 1900. He worked especially with peas, and the amazing thing is that his laws have been found to apply to many things, in many kinds of animals and plants, so that we can illustrate them from

HOW THE OLD LIFE PASSES INTO THE NEW

Pronucleus or Gamete of
the Male Parent
containing the
Chromatin
network
and
Centrosome

Pronucleus or Gamete of
the Female Parent
containing the
Chromatin net-
work and
Centrosome



This picture represents the astonishing process by which the first complete cell of a new plant or animal life is produced. At the top we see a segment of the egg, with the female "pronucleus" at the right. The male "pronucleus" at the left has just made its way into the egg and is approaching the female. Notice the black dot in each "pronucleus"—those are the energy centres called "centrosomes." In the next section, the male and the female "pronuclei" have drawn close together and the two "centrosomes" have come out and arranged themselves in the space between the pronuclei. In the third section, the "centrosomes" have developed radiating threads, forcing the nuclei together. Finally, at the bottom, the male and female elements have merged into one group. At this instant a new life begins. The chromatin from each "pronucleus" has arranged itself into a central mass, which is composed of exactly equal parts of male and female substance. The new cell will now begin to grow as a separate life unit, inheriting its vital germs from both father and mother cells. How this new cell now proceeds to split up and form other new cells is explained in the picture on page 501 with the article on Biology.

considering animals such as guinea-pigs. If the two parents are from pure strains, *black* and *white*, the children will be, not *grey* as might be expected, but *all black* in the first generation—all *apparently* pure black! But in the next generation we find one-fourth of the children pure *white* again, one-fourth pure *black*, and a half *apparently* pure black, but really *mixed* again. The pure whites and blacks will breed true, but the mixed ones will yield children of which a quarter are pure white, another quarter pure black, and half mixed. And so on, indefinitely. You see, in the *apparently* black there is hidden the white, to come out pure again in a quarter of the children of the next generation. In this case, where the black temporarily hides the white, the black is said to be "dominant" over the white, which is "recessive". In another type of inheritance, however, as in many plants, the offspring will be half-way between the two parents, and crosses of *reds* and *whites* will yield *pink* in the first generation. But in the next there emerge a quarter pure red, another quarter pure white, and half pink. The whites are pure, so are the reds, but the pinks are mixed, and will behave exactly as in the colour of the guinea-pigs—only one colour is not "dominant" in this case.

Examples Proving Mendelism

Only a very few of the many illustrations of Mendel's law can be cited, and it must be remembered all the while that it is a matter of experiment in all cases to find out whether any feature of any animal or plant will follow Mendel's law. The following are among the most interesting. In rabbits and guinea-pigs, black is dominant over white, and short hair is dominant over long hair. Among cattle, hornless character is dominant over horned, short legs over long legs. In horses, bay is dominant over black or chestnut, and grey over all other colours, and pacing over trotting. In pigs, pure white is dominant over colour, and black over red. In dogs, grey is dominant over black, and any pure colour over mixed colours, like black-and-tan. These are but a few of the illustrations for a few animals, hundreds of others might be cited. It should be said, too, that some of the "laws" or principles that have been discovered are much too intricate to give here. But enough is known to show that much advantage may be derived in future by applying what has been discovered in improving many of Man's domestic animals and plants.

Inheritance in Human Beings

What do we know of the laws of heredity as applied to *Man*? Things we inherit fall under several types, and the following is one classification. In matter of stature, size of body, skin-colour, shape of head and features, children are apt to be intermediate between father and

mother. The following illustrate the Mendelian observed facts. Dark eyes dominate over light eyes, two-jointed fingers over normal three-jointed, brittle bones (of some people) over normal bones, normal eyes over colour-blindness and night-blindness, normal minds over feeble-minded. And so for other things. But it should be said that most human characteristics have not yet been shown to follow Mendel's classification.

What Parents May Pass On

The following conditions are certainly hereditary, but how exactly the effects are produced is not yet certain. Defective teeth and hair, hare-lip, tendency to twins, left-handedness, supernumerary fingers and toes, and some forms of deafness. The following are subject to heredity, but to what extent and how they are inherited is not known: general mental ability, ability for art, music, mathematics, congenital organic defects, some forms of epilepsy and insanity, longevity, etc.

There is often an impression that diseases are inherited. It is true that a marked *tendency* towards some diseases may run in a family, just as in other families there is a natural immunity against some diseases. But a disease itself is not inherited usually, although some diseases are congenital, that is to say derived from one or other of infected parents. Tuberculosis is a disease due to tubercle germs. A child may be born with the so-called constitutional tendency to the disease, but the germs come in after birth, with the food, water, or air. In other words, what is inherited is lower immunity against tuberculosis.

Nature or Nurture?

The relative importance of heredity and environment in a human life is a question as old as the ages—a question, perhaps, not possible of a very accurate solution. Of course, it is clear to anyone that life is a very intricate fabric, in which the "warp" is supplied by heredity, and the "woof" by the things that come into one's life, mostly after birth. All those things that come in after birth make up what is usually called the "environment"—the food we eat, the air we breathe, the water we drink, still more important, the surroundings that make for moral and mental welfare or disaster.

On the one hand are those who maintain that a person is so strongly stamped by heredity—the things he brings into the world with him—that whatever he is and does in life is almost wholly the result of his inheritance. On the other side are those who maintain that the child at birth is so plastic that there are practically no limitations to its possibilities, that, with proper surroundings and education, all for good is possible, with untoward surroundings, all for bad. The truth certainly lies somewhere between the two extremes. Education today is making

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the line of demarcation less sharply defined. Certainly the main qualities are stamped by heredity—stature, "stamina," tendency to good health, general ability, temperament—or the reverse of all these. But the outlet for any personality is most certainly dependent on its surroundings, and what a person becomes will much depend on his place and mode of life, his education, friends, all of the multitude of things that make up his "environment." Just as there are sandy, sterile soils and very fertile soils, and all grades between, so there are defective minds (the feeble-minded) and geniuses, and all grades between. And just as there are sterile soils for which cultivation will do no thing, while it will help much the other soils, so there are the helpless minds, for whom education and other forms of help avail little or nothing, while they avail much for the average mind, and most of all for the superior mind.

The weak person is always weak, whatever the surroundings, the person of average native ability and personality will be very much what his surroundings make him, while the strong person will be strong in any place or station in life. The particular form which his strength will take will depend on time and place. The person of average native ability will still be average in almost any time and place, while a great career is a combination of great native ability, character, and personality, with great opportunity.

Herefordshire.

This verdant and fertile English county, covering an area of 842 square miles, is so far off the beaten track that the average person would find it difficult clearly to define its position without looking at the map. Tucked away on the eastern borders of South Wales, it has the counties of Shropshire on the north, Worcester on the east, and Gloucester and Monmouth on the south.

HEREFORDSHIRE

It measures nearly 40 miles from north to south, and about 35 miles from east to west. The major portion of the surface consists of gentle undulations at a mean elevation of about 350 feet above sea level, but on the eastern boundary rise the Malvern Hills, whose highest point is about 1,400 feet, while on the Brecknockshire border there are the Black Mountains, a range reaching an altitude of 2,531 feet.



HEREFORD'S ANCIENT CATHEDRAL

J. Dixon-Scott

There has been a church on the site of Hereford Cathedral since the 9th century, and parts of the present building date from the 11th century. The cathedral is small, and its interest is chiefly due to the fact that it exemplifies many architectural styles. The central tower, 165 feet high, was erected in the first half of the 14th century. This photograph shows the east end of the Cathedral.

Herefordshire lies within the basin of the Severn, the Wye, its principal river, falling into the Severn estuary.

The only considerable place in the shire is the county town of Hereford, with its cathedral, which embodies several styles of architecture. It was begun in 1079 on the site of an earlier building, but it was not completed until about

1150 Alterations and additions have since been made at various times and in 1900-5 the west front was reconstructed. The Chapter library has a collection of chained books and manuscripts, and a remarkable illustrated map of the world designed about 1313.

Among other interesting old buildings in the city are the Bishop's Palace and the beautiful college of the Vicars Choral. The bishopric of Hereford is one of the very few which have existed almost without interruption since the very earliest days of Christianity in Britain. There was certainly a Bishop of Hereford in A.D. 544, and there were thousands of Christians and many churches in Herefordshire and in Wales, of which it then formed a part, for some time before St. Augustine came.

Indeed, a Bishop of Hereford was one of the seven British prelates who met St. Augustine in A.D. 601, when the latter, as the first Archbishop of Canterbury, called a convention, and unsuccessfully tried to unite the Christians of Wales with the English Church.

Hereford (pop. 24,000) is a very ancient town, and even in Norman times was a place of importance, and often used as a stronghold in the frequent fighting between the English and the Welsh. As a result of this border strife the county is rich in old castles, the chief ones being Hereford, Clifford, Weobley, Wilton, Goodrich, and Wigmore. Leominster, another Herefordshire town, was also a considerable place at the time of the Domesday survey.

The principal industry in Herefordshire nowadays is, as it has always been, agriculture, and Hereford cattle are world-famous. For many centuries it has been a great cider county.

Prior to the coming of the Romans, this part of England was inhabited by the Silures, who, after offering a stern resistance, were eventually overcome, and found a refuge in Wales, where Caractacus was at last captured. Battles were fought in the county during the struggle between Henry III and the Barons and in the Wars of the Roses.

Herefordshire has few literary associations, though Richard Hakluyt, the geographer, came of a family long established near Ross, and Elizabeth Barrett Browning passed some early years near Ledbury. Nell Gwynn is said to have been born in the county, David Garrick was born at the Angel Inn, Hereford, and Mrs. Siddons lived in the county during the early part of her life. Population about 111,750.

Hereward THE WAKE Here is a name that conjures up for every English schoolboy the virtues of patriotism, gallantry, selflessness, and bravery. The "last of the English," as Charles Kingsley has styled him, Hereward the Wake is one of the heroic figures of English history. He was by no means the "last of the English."



HEREWARD INSPIRED BY SONG

As a boy Hereward's greatest delight was to listen to the patriotic songs sung to him by his friend Leofric to the accompaniment of the harp. When later he took up arms against the Normans, Leofric was his faithful henchman.

In a literal sense, the Angles and the Saxons, or the English, as they had come to be called, continued to represent the bulk of the population of England even after they had passed under the kingship of William the Conqueror. Hereward was the "last of the English" in the sense that he was the last outstanding defender of the soil of England against the Normans.

Here is a clear picture of this fearless champion of England, who held out against Norman King William himself on the last remaining stronghold of English soil—namely, the Isle of Ely.

The particulars of Hereward's parentage and birth cannot be stated with certainty. "Some say that his father was the great and noble Earl Leofric, who possessed nearly all central England in the reign of King Edward the Confessor."

It seems certain, however, that he was of noble birth, and belonged to the land-owning class, otherwise he would never have risen to the eminence he did, or been in command of the last remnant of the English defenders in the Isle of Ely, or have had under him great English noblemen like Earls Edwin and Morcar.

He appears to have been banished from England in the reign of Edward the Confessor,

because of his hatred of the Frenchmen whom that king had about his court, and to whom he had given high positions in his realm. Hereward accepted his outlawry not unwillingly, believing that he would gain for himself fame and honour by his courage and skill in arms. The passion of his boyhood had been to listen to the stories of great warriors and the battle-songs of the Saxons.

His mother had hoped to make a monk of him, but he hated the cloister, and loved the open air, loathed study, and longed for the life of the camp. He had a companion, too—Leofric by name—who equally loathed the idea of a monkish life, and one day this lad, while in company with Hereward and the latter's brother Algar, took a harp in his hands, and sang thus to Hereward:

Before thine eyes the future dim
Seems to unroll its shadows grey,
And only thee, my lord, I see—
Athwart the foeman's blood-stained way
A path of glory fore thee spread,
Some mighty deed marks each new day.

The youthful harpist Leofric thus became Hereward's first faithful follower. He served him for many years, and afterwards became his biographer, and it is to his account that we are indebted for much that we know of Hereward.



HEREWARD KILLS A GIANT

Wandering into Cornwall—so runs a tale in Charles Kingsley's *Hereward the Wake*—Hereward quarrelled with a Pictish giant Ironhook. With the giant's own magic sword, given to him by the princess of Cornwall, he slew Ironhook in a mighty fight.

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Hereward returned to England on hearing that his mother's estates had been given to a Norman, and one of his first exploits was to lead the Danes against the wealthy monastery of Peterborough, ostensibly to prevent its riches falling into the hands of the newly-appointed Norman abbot, Turolf.

The last invasion of England by the Danes took place in 1069, and was inspired by the hope of placing Sweyn, the nephew of Canute, on the throne. Hereward and the warlike remnant of the English flocked to their standard, hoping, with their help, to drive out the Normans.

In the course of this raid, Peterborough was burnt and sacked, and the indignant and ruined monks excommunicated Hereward, while the Danes embarked with their plunder, leaving the English to the tender mercies of the armies of William the Conqueror.

Undismayed by the formidable forces which King William brought against him, Hereward entrenched himself in Ely, where the monks who had forgiven Hereward, armed themselves in his service, and where the surrounding fens protected them against being taken by assault. He made a heroic defence, but at last William built a causeway, crossed to the island, and Hereward and a few of his followers fled through the marshes. What happened to Hereward afterwards is not known, but according to one account, for which there is some evidence, he made peace with the Conqueror, who gave him honours and lands. An idealized version of Hereward's life is given in Charles Kingsley's novel, *"Hereward the Wake"*.

Hermes. "A schemer, subtle beyond all belief" was the Greek god Hermes, also called Mercurius (Mercury) by the Romans. He was the son of Zeus and Maia, daughter of Atlas. He began his career by escaping from his cradle when a few hours old, and going out in search of adventures. Finding a tortoise, he took the shell and stretched cords across it, thus inventing the lyre.

That same evening he stole the oxen of Apollo, god of the sun, hid them in a cave, and killed two of them. When Apollo discovered the theft, Hermes so charmed him by playing on the lyre that he allowed the little rogue to go unpunished. Hermes gave his lyre to Apollo, and received in return Apollo's own golden shepherd's staff, which bestowed wealth and prosperity and turned everything it touched into gold.

Hermes was made the herald and messenger of the gods, and in this capacity one of his many duties was to conduct the shades of the dead to the lower world. Among men he became the patron of merchants, the god of eloquence, of good fortune, of prudence and cunning, of fraud and theft. He was also



HERMES, MESSENGER OF THE GODS

This magnificent bronze by Bologna represents Hermes, whom the Romans called Mercury, with the traditional winged and brimmed hat, winged feet, and "caduceus" The last is a magic wand entwined with serpents and bearing another pair of wings

Florence National Museum photo Anderson

regarded as the god of the roads, and the protector of travellers. Pillars with his image at the top were erected as sign-posts.

Hermes was represented most commonly as a slender youth, wearing a broad-brimmed hat adorned with two small wings, and carrying his magic wand in his hand. On his sandals were wings that bore him over land and sea with the swiftness of the wind.

Hero and Leander The imperishable story of Hero, priestess of Aphrodite, and Leander, the stalwart youth who nightly swam the Hellespont to meet her, stands in literature as one of the supreme examples of ill-fated love. According to the story as told by various Greek and Roman poets (notably Musaeus in the 5th or 6th century A D), Hero used to place a lamp at the top of her lonely tower at Sestos each night to guide her lover through the waves from Abydos on the other side of the strait.

Venturing to make the passage one stormy night, he was drowned, and his body was washed up to the tower. Seeing the lifeless form of her lover, Hero plunged into the water that she might join him in death. Christopher

Marlowe wrote a fine poem on Hero and Leander, and Byron, who himself accomplished the difficult feat of swimming the Hellespont, refers to the tale in those well-known lines

The winds are high on Hellas wave,
As on that night of stormy water
When Love, who sent, forgot to save
The young, the beautiful, the brave,
The lonely hope of Sestos' daughter

Herod. This was the name of several rulers in Palestine, Herod the Great, king of Judaea from 37 B C to 4 B C, was the most conspicuous. Scholars in general hold that Jesus of Nazareth was born towards the end of his reign. Herod Antipas, son of Herod the Great and tetrarch (tributary prince) of Galilee from 4 B C to 39 A D, is the Herod most frequently mentioned in the New Testament, to him Jesus was sent by Pilate.

Herodias, the granddaughter of Herod the Great and wife of Herod Antipas, instigated Salome, her daughter by her first husband, to ask of Antipas, whom she charmed by her dancing, the head of John the Baptist on a



THE LAST WATCH OF HERO

Every night Hero, according to the classical legend, used to watch her lover, Leander, swimming across the Hellespont to her. One night she watched for him in vain, for Leander had been drowned. When she knew, she drowned herself in the water that had killed him.

Painting by Lord Leighton Manchester City Art Gallery

charger (a large flat plate), and this was granted her John had angered Herodias by denouncing Herod Antipas for casting aside his first wife for her. Several operas have been based on this story, which is also a favourite subject in painting.

Herodotus. (484-c 425 B C). The "Father of History," as Herodotus is called, was born at Halicarnassus, on the shores of Asia Minor, and as it was then under Persian rule, he was technically a Persian. He early devoted himself to a literary life, and travelled extensively, visiting the shores of the Hellespont and the Black Sea (Euxine), as well as the countries of Scythia, Syria, Palestine, Babylon, Egypt, and the northern part of Africa.

He investigated both the customs and religion of the peoples and the history of the countries through which he passed. He made use of the material which he gathered in his great work—the first specifically historical work ever written. The special purpose of Herodotus's work, which consists of nine books, is to give an account of the conflict between the Greeks and the Persians, but he often turned aside from his main purpose to describe interesting things he had seen or heard. His work is thus a rich source of information for the early history of all the lands about the eastern Mediterranean.



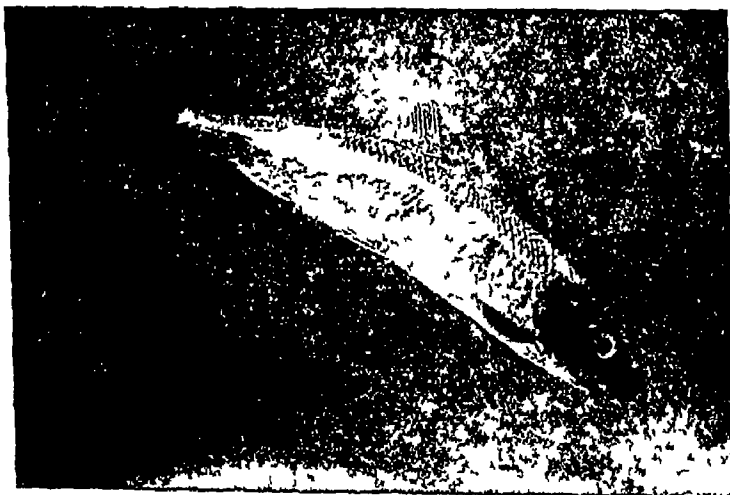
HEROD ANTIPAS AND JOHN THE BAPTIST

Decorating one of the walls of the cloister of the Scalzo, Florence, is this representation, by Andrea del Sarto, of St. John the Baptist being bound before Herod. Like other artists of his day, del Sarto clothed his figures in the dress of his own period.

Herring. Has it ever occurred to you how many ways there are of eating the herring? You may eat it fresh, or partly smoked, when it is called a "bloater", you have it again, smoked and cured more fully, as a "kipper" you may be served with it salted, or, if it is a small herring, in a tin, and you may eat its roes, again, as a quite separate dish. And this list, of course, makes no allowance for the many ways of cooking your fresh herring, once you have bought it. You can grill it, or fry it, steam it or bake it, or—most delicious of all, many people will say—have it "soused" in vinegar with raw onion, cloves, and bay leaves. So you will

not be surprised to hear that this is actually one of the most important of all food fishes, and its family, the *Clupeidae* is indeed the most valuable of all fish families from an economic point of view. For besides the herring itself (*Clupea harengus*) it includes the sprat, sardine or pilchard, anchovy and various species of shad, the last of which are more important as food fishes on the American than the European side of the Atlantic, while they have also been successfully introduced into Pacific waters.

Not unnaturally, we know more about the life history of the herring than about that of



A FULL-GROWN HERRING

One of the most important of all our food fishes, the herring looks a really typical fish, with few features peculiar to itself. The fins are small, the tail is deeply forked. Points to note when comparing this with the photos of the sprat and pilchard (page 2083).

HERRING



"Daily Mirror"

A YARMOUTH DRIFTER HAULS IN HER SILVERY CATCH

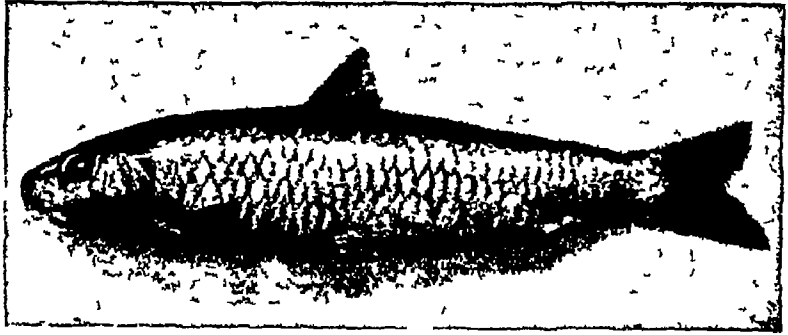
While you are asleep the hardy fishermen are often toiling on the heaving billows of the North Sea to catch the silvery herring that perhaps you will have for breakfast in a few days' time. In this photograph a catch is just being hauled in, though it is by no means as good a haul as is general. Notice how the small mesh of the drift net holds the fish fast by the gills.

many food fishes, for its presence or absence is a matter of vast importance to the herring fleets whose men earn their livelihood at the fisheries. It is known, for example, that the herring migrate to definite localities in such waters as the North Sea, when spawning time comes, that they spawn at two different seasons of the year, that they are not mature and do not spawn until they are five years old, and that they are of the class known as "demersal" fish, that is, they spawn at the bottom of the sea, or among seaweed. Another thing about the herring is that not only does it, after spawning, frequently run up into salt-water lochs for a while, but it can also survive in those which are practically pure fresh-water. Moreover, the loch-frequenting herring are considered to belong to a race quite distinct from those found in the deeper waters, and these two races are known as coastal and sea herring respectively. The best commercial variety of coastal herring is the Loch Fyne. Moreover, while the former spawn in the spring, the latter do so in the autumn. This is one of the most important of all the discoveries made about

herring, for on it depend the different fisheries, and by taking advantage of the presence of the shoals in different places at different times, the fisheries can survive without severe competition. At the same time, there has for some years been a feeling that the herring is perhaps "over-fished" and that there is a danger of its numbers decreasing so seriously as to affect the livelihood of the fishermen themselves. In some years, however, there is a glut of the fish, and the price is so low that the fishermen make no profit, or they may even be unable to sell all their fish. (*See Fisheries*)

Herrings are caught in nets, usually by "drifters," that is, boats which set out their nets and then drift across or through the shoals. The headquarters of the English industry are at Grimsby, Yarmouth, and Lowestoft on the East Coast, while the Scottish herring fishery is largely carried on from Wick, Aberdeen; and elsewhere, the boats operating off the Shetlands in spring, and off the Orkneys as well as the East Scottish coast later in the year. There are great fisheries for spring herring off the coasts of Norway, and in the Baltic.

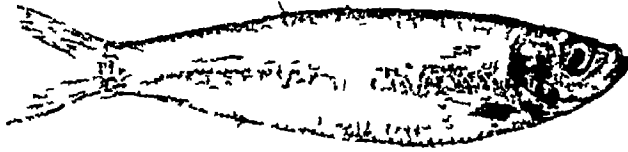
An important industry is the pilchard fishery, carried on largely off Cornwall. The pilchard (*C. pilchardus*), formerly regarded as rather a delicacy and sold largely to Italy, where the fish were salted, is now familiar to all in tins. Small pilchards are the sardines, even better known as a tinned fish, which



SPRAT AND PILCHARD

Here are two of the smaller members of the herring family, the sprat (left) and the pilchard (above). Both are the subject of fisheries, but, whereas the sprat is usually eaten fresh or fried, you most often get the pilchard out of a tin.

Photos H. H. Goodchild & W. S. Berridge



Hertfordshire. (Pron har'ford-shir) "Hearty, homely, loving Hertfordshire," as Charles Lamb eulogized it, is a beautiful pastoral English county,

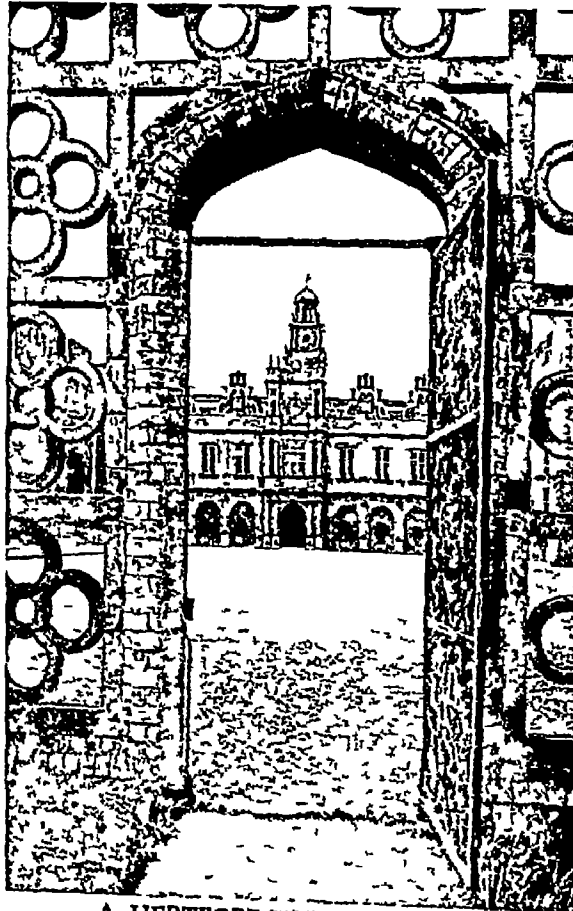
632 square miles in extent, and stretching northwards for thirty miles from the northern suburbs of London to the borders of Bedfordshire.

It is a pleasant and undulating land, with many woodlands, and wide stretches of arable

are caught off France. Sprats (*C. sprattus*), found especially in estuaries and the firths of the Scottish coast, are also the subject of an extensive fishery. You probably know them best as the small fish which you fry quickly and eat at

once, in winter, but at one time almost all the tinned, so called 'sardines' were sprats, caught in Norwegian waters. Legal action later put a stop to this, and now, if you buy tinned 'sardines,' they are the real thing, while the sprats or other small fish may be hidden under any variety of names, each of which refers to a different brand. In Norway they are known as 'brisling.'

Yet another food fish which is closely related to the herring is the anchovy (*Engraulis encrasicolus*), a migratory species inhabiting the southern North Sea, the English Channel, and the waters farther south. It is only eaten salted, or in the form of anchovy sauce, which, however, suffers from being frequently made from the wrong fish. It has a rich pungent flavour



A HERTFORDSHIRE MANSION

For over three hundred years the home of the Cecils, Hatfield House is one of the finest early Jacobean mansions in England. It was finished in 1611, and here is a view looking through the lovely brickwork towards the south front of the house.

Photo H. & F. Joel

land, peculiarly suitable for wheat growing. An extension of the Chiltern Hills, in the form of grassy downs, stretches across it.

There are no large rivers, but quite a number of small streams. The most important of these are the Lea, Ash, Beane, Hiz, Ivel, Maran, Stort, and Ver. The artificial New River, which supplies much water to London, runs nearly parallel with the Lea. Herts (Pron harts), as it is abbreviated, is rich in historical sites. In Roman times the capital of southern Britain was Verulamium, near St Albans (q.v.), itself one of the oldest towns in Britain. There are many famous houses in the county, including Hatfield, Knebworth, and Panshanger. The principal towns are Watford, now an important industrial

and agricultural centre, St Albans, Hertford (the county town, population 11,300), Hitchin, Welwyn, and Letchworth, the first "garden city". Part of Whipsnade, the country branch of the London Zoo, lies within Hertfordshire. Other modern developments in the county are the film studios centred on Elstree, the aircraft works at Hatfield, the wireless transmitter at Brookman's Park, and the Rothamsted experimental scientific station near Harpenden.

Hertfordshire is rich in literary associations, and is particularly connected with the name of Charles Lamb, whose early memories of the county are recorded in his essays. Francis Bacon lived at Gorham-bury, near St Albans, the poet Cowper was born at Berkhamstead and introduced Ware into his poem, "John Gilpin". Bulwer-Lytton, the novelist, inherited Knebworth, which still remains the seat of his family. The population of Herts is about 400,000.

Hertz, HEINRICH RUDOLF (1857-1894)

When you listen-in to the wireless or communicate by wireless telegraphy or by telephone within a few seconds with a friend thousands of miles away, you are enjoying the fruits of the greatest discovery in physics of the 19th century.

To a young German named Hertz, who at first fancied he might become a competent engineer, but later was to find in pure science his true niche, the 20th century owes much of all it has enjoyed and benefited from, following the discovery that light consists of electro-magnetic vibrations, or, to put it in another way, that electro-magnetic effects are propagated through space in the same manner and at the same speed—186,000 miles per second.

Hertz was born at Hamburg, February 22, 1857. Leaving school, he went to study at Munich University, and there, under the influence of the great Helmholtz, physiologist and physicist, who formulated the law of the "Conservation of Energy" and gave to medical science the ophthalmoscope, the young student devoted himself to physical science. Soon he became Helmholtz's chief assistant, and in the short space of three years his original theories and papers had won for him a high place among

the scientists of the world. During this period young Hertz won many academic honours.

That much-neglected British scientist, James Clerk-Maxwell (*qv*), had several years before given mathematical expression to the relationship between electric and magnetic forces. His formulae proved that ordinary light waves were in reality short electro-magnetic waves. But it took twenty years to prove practically what Maxwell deduced from pure calculation, and Hertz was the genius to demonstrate it. He proved to the world of science the existence and nature of those waves to which the name "Hertzian Waves" was given, and so paved

the way for wireless communication. This brilliant scientist was only thirty years of age when he discovered and proved experimentally the identical correspondence between light waves and electro-magnetic waves of the ether.

Hertz made many further discoveries regarding the propagation of electro-magnetic waves through space, the measurement of the length and speed of such waves, how they are reflected, refracted, and polarized in identically the same manner as light waves. It is not without interest to learn that at this period, 1887-1889, he just missed discovering the X-rays which W. K. Röntgen announced to the world in 1895.

But science, which he had so nobly enriched,

could not help Hertz, and, after a long illness, this brilliant expositor died at Bonn, January 1, 1894, aged only thirty-seven years.

Hertz's scientific contributions were translated and published by Professor D. E. Jones in three parts: "Electric Waves" (1893), "Miscellaneous Papers" (1896), and "Principles of Mechanics" (1899).

Hertzog, JAMES BARRY MUNNIK (b. 1866). Only a few decades ago many of the statesmen who now govern the Union of South Africa were fighting against Great Britain in the Boer War (1899-1902). One of them was General Hertzog, who was born in South Africa of Dutch-German parents and was one of the Boer generals. After the war he continued to be hostile to the British Government, and was an ardent champion of the cause of the Boer Nationalists.



HEINRICH HERTZ

This brilliant German scientist began the study of electro-magnetic waves in 1885, and achieved remarkable practical results. Upon them the whole of modern wireless communication is based.



GENERAL HERTZOG

One of the most remarkable men South Africa has ever produced, General Hertzog has been an important figure in his country's political life since long before the World War. Here you see him arriving to attend the Coronation in 1937.

In 1910 he became Minister of Education in the first Government after the passing of the Act of Union, but he retained his office only until 1912, when he retired owing to his strong differences with Botha and Smuts, and his animosity towards Britain. When, in the early days of the World War, two former Boer Generals, Beyers and De Wet, rebelled, Hertzog tacitly approved.

In 1915 he became leader of the Nationalist party, and worked strenuously to secure Dutch supremacy. His party was beaten at the General Election of 1921, but in that of 1924 it obtained a majority, and Hertzog became Prime Minister of the Nationalist Government, also holding

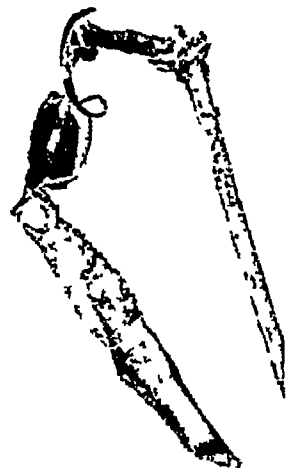
the portfolio of Minister of External Affairs. Experience of high office considerably modified his views, and in 1933 there was a reconciliation between Hertzog and Smuts and a National Government was formed, Hertzog being Prime Minister and Smuts Minister of Justice. From that time General Hertzog was no longer hostile to Great Britain, and on many occasions, notably after he had attended the Coronation of King George VI, he declared his determination to maintain the Imperial tie. Despite this headvocate neutrality on the outbreak of war in September 1939, and when his motion was rejected by the National Government, he resigned.

Hibernation.

Often, during the winter months, you find butterflies and moths hidden away behind the curtains

and pictures, or up in the attics apparently dead, yet able to fly after an hour or so in a warm room. In the same way, as you know, the pet garden tortoise, or the hedgehog which you used to see in the summer months, disappears underground during the winter, so that you may dig them up in the leaves of the ditch, or find them hidden beneath the tool shed. In these creatures, as in the butterflies, you are witnessing the strange problem

of hibernation. In northern countries the great majority of adult insects, worms, etc., and of the marine life fixed between high- and low-tide range, die in winter, leaving immature stages to revive their race in the succeeding spring. Fishes of brooks and shallow streams, and of the shallows near shore, retire to deeper water, and some even bury themselves in the mud. Many birds fly southward and almost all of them



A B Dennis

A HIBERNACULUM

This white admiral caterpillar has woven a little 'hibernaculum' in a leaf, where it will rest secure during the winter.

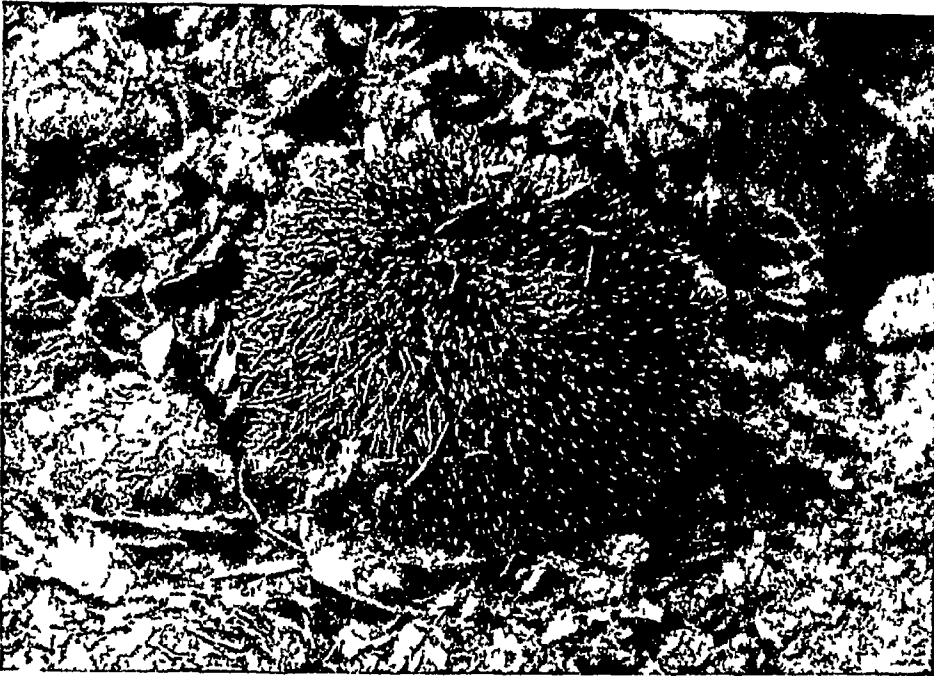


SNAILS GET READY FOR WINTER

Snails are among those creatures which go into hibernation, and these fine specimens are preparing to do so. No need here for an underground den or neatly woven hibernaculum; they just shut their front door with a hard plate of secreted material and retire inside their shells until the sun warms them and brings them out again.

Photo J G Johnson

HIBERNATION



in winter, and has not learned to gather and have under cover a store of imperishable supplies such as nuts, seeds, dried fungi, and the like. Yet even the true hibernators prepare unconsciously for the ordeal by eating amply in the abundance of autumn, when Nature's bounty is greatest, and storing up, in the fat which then covers their bodies, fuel destined gradually to be absorbed as nourishment during sleep.

retire to country where there is more easily obtainable food. This leaves quite a large number of animals of various classes which, so far as passing the winter is concerned, may be divided roughly into two classes—those able to obtain food during the snowy season, and those whose food supply is cut off by the winter.

For these latter, the only alternative to death is hibernation—sleep in a sheltered place, and it is resorted to by all kinds of northern land creatures. Earthworms burrow below the reach of frost. All manner of insects in their pupal stage lie inert within cocoons, while others remain dormant as eggs or larvae. Frogs and other amphibians bury themselves deeply in the mud of the pond, or in loose soil and rotting stumps. Snakes coil up in crevices of rocks or holes in the ground. And some four-footed animals occupy deep burrows or warm nests, where many pass from sleep to death, and find their *hibernaculum* (wintering-place) a grave.

In almost all cases of hibernation, the animal is one that is unable to get its accustomed food



ALL READY FOR HIBERNATION

Many of our wild animals go into a state of more or less complete hibernation, and here are two examples. Above, a hedgehog has been discovered, rolled up into a neat ball and well protected by its armament of spines, as it sleeps. In the lower picture, you see a field vole about to enter the burrow in which it will winter, feeding on a store of food put ready in advance.

Photos J. J. Ward G. Hearn

thus that the female polar bear passes the cold months, but the males are abroad during all the long, dark, polar night, even in the farthest north. In the case of other northern species, the males also hibernate, each by itself, but are liable to come out at times in search of food.

Another irregularity is shown in the marmot,

What is the nature of this dormancy? We do not know. It seems not to be different from ordinary slumber, except in its depth and prolonged duration, and hibernating animals differ much in the soundness of their sleep. Some, such as the squirrel, are light sleepers, and often on mild days will wake up, come out, and move about indolently until the return of cold sends them back to bed. Bears are popularly regarded as special examples of hibernation, but they are among the most irregular. In very cold and snowy countries the females "lay up" early, and may be snowed under for weeks. They simply lie quietly, subsisting on their accumulated fat. It is

HIBERNATION

which retires underground very early while plenty of green herbage remains for its nibbling. This may be due to a habit inherited from former conditions, when winter came earlier and ended earlier, for the marmot often comes out in spring long before he should. An even more striking example is shown by certain bats, which retire in July, when insects are still plentiful.

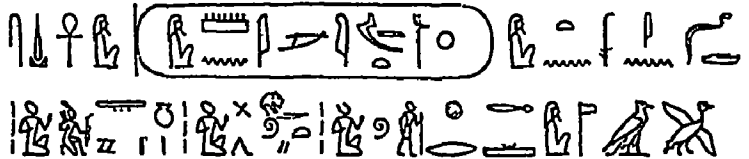
Many insects hibernate only lightly in the adult state and on warm days in January you may see quite a variety of butterflies out and about. Hive bees, too, which are always awake, are easily tempted forth, the bee-keeper fears this, for the bees, flying far away, are overtaken by the cold of the early evening and perish before they can return.

In the tropics, many creatures go in for aestivation, that is, a prolonged summer retirement, brought about by lack of water and food, or weather conditions.

Hieroglyphics. The picture characters which the Egyptians used in writing are commonly called hieroglyphs or hieroglyphics (from the Greek for sacred and carving). In the early Roman period the knowledge of hieroglyphic writing was lost, and all attempts to decipher it failed until the early years of the

HIGHWAYMEN

nineteenth century, when Thomas Young deciphered some of the characters of the Egyptian alphabet. The difficulty was finally solved by the discovery of the Rosetta Stone, now in the British Museum, and of a stone obelisk from Philae which now stands in the park of Kingston Lacey, Dorset. It was customary for kings to publish their edicts in two or more languages, and each of these monuments bears both a Greek and Egyptian version of the inscription. By studying them it has become possible to translate all hieroglyphics.



HIEROGLYPHICS OF ANCIENT EGYPT

The illustration above shows the earliest form of Egyptian hieroglyphics. The characters are all pictures, generally recognizable. In a later form only the most salient forms of the characters were preserved, and eventually they became merely conventional representations of the hieroglyphics.

Highwaymen. In the late 17th century and in the 18th no traveller along the public roads of England could be sure of reaching his destination safely, with his money intact, or even his life, for this was the age of the highwaymen. And this state of things lingered on until the early 19th century.



A DANCE WITH THE HIGHWAYMAN AFTER 'STAND AND DELIVER!'

Among highwaymen Claude Duval was famous for his daring robberies and the gallant way in which he treated the ladies who were involved in them. It is related that he once waylaid a coach in which a husband and wife were travelling with £400 in cash. Duval asked permission to dance with the lady on the turf by the roadside, and, the dance having been performed before the lady's husband, Duval asked, and received, a hundred pounds for the entertainment, and then let the couple go on their way. The scene is here depicted in a painting by W. P. Frith R.A.

These outlawed desperadoes waited in ambush and held up the coaches at the point of the pistol, then proceeding to relieve the passengers of all the valuables they had about them. If the orders of these "gentlemen of the road" were disobeyed, then woe betide the unfortunate traveller.

Many are the stories and legends which have grown up around the highwaymen. Everybody has heard of Dick Turpin and his ride to York on Black Bess. Turpin was certainly a historical character, he lived from 1705 until 1739, and made quite a business of cattle-lifting, smuggling, and thieving, as well as being a notorious highwayman. The story of Turpin's ride, however, is mythical, despite Harrison Ainsworth's description in "Rookwood," and is probably based on the amazing feat of one "Swift Nick" Nevison, who in 1676 is said to have robbed a sailor near Rochester, in Kent, at 4 a.m. and to have established an alibi by reaching York at 7.45 p.m. on the same day. Nevison, like Turpin, came to an untimely end on the York gallows.

The most romantic figure among the highwaymen was undoubtedly Claude Duval (1643-70), a native of Normandy. The epitaph on Duval's grave in Covent Garden church in London indicates his place in popular estimation:

Here lies Du Vall Reader, if male thou art
Look to thy purse if female to thy heart

Himalaya Mountains. (Pron hi-mah'-la-ya or him-a-lā-ya) Compared with other ranges the Himalayan is not extensive, for its length is only about 1,500 miles, and its average breadth about 200 miles. In elevation, however, it is unique. From the southern of its two parallel ranges between 40 and 50 peaks spring more than 23,000 feet in the air, overtopping all other mountains on the earth. Mount Everest, the highest of the Himalayas, is 29,002 feet, or nearly five and a half miles high, and the average elevation of the passes is 18,000 feet.

Lying on the northern frontier of India, the Himalayas extend from the great bend of the river Indus to the Brahmaputra on the east, and separate the plateau of Tibet from the plains of the Ganges. They are in the sub-tropic latitude, so the snow-line is lifted to 16,000 feet. The lofty southern range forms a wall which intercepts the heat and moisture from the Indian Ocean. At some points on the southern slope 600 inches of rain fall in the course of a year, while the inner range and the Tibetan table-land are dry, cold, and half-desert.

Up to 5,000 feet on the southern slope the tea plant is cultivated in the famous gardens of Darjeeling, and other places. Here, and at Simla and elsewhere, are fashionable pleasure and health resorts for civilians and British soldiers in India. Grains and fruits are grown up to

12,000 feet, and in the summer months herds of cattle are pastured on slopes up to 18,000 feet.

Tigers and leopards are perils of the habitable regions. The passes are blocked with snow from November to May. From melting snow and glacial fields, innumerable streams and cascades drop down through wild gorges to supply India's three great rivers with the floods which they pour every summer into the Indian Ocean.

The Hindus from ancient times have held the Himalayas in reverence as the home of the gods. Pious pilgrims still ascend to the source of the sacred Ganges for seasons of penitence and prayer. To people coming up from the steaming heat of the valleys, the greatest marvel of all is the snow-mantled, jagged ridge-pole of this "roof of the world." The name Himalaya is from two Sanskrit words which mean "dwelling-place of the snow." (See also Everest, and map with article on Asia.)

Hindenburg, PAUL VON (1847-1934) Soon after the World War broke out, a hurried message was sent by German army headquarters to an obscure German general who had been living unnoticed in Hanover since his retirement, at the age of 64, three years before. He was asked to take command against the Russians, then pouring over the eastern borders.

The old man replied by telegraph, "I am ready," and within two weeks set the world gasping by practically annihilating the invading forces in the battle of Tannenberg, in the Masurian Lakes region. (See World War.)

Thus Paul von Beneckendorf und Hindenburg—the names are those of his family estates—in his old age started a second career that was to make him outstanding in his generation. In August, 1916, after the battle of Verdun had failed to win the war for Germany, Hindenburg was given the chief command. Next year, he beat off a tremendous Allied drive to break through the Western front, by a stubborn defence in new positions generally called "the Hindenburg Line." In 1918, Germany was forced to appeal for an armistice, and it became Hindenburg's bitter duty to lead his defeated army home. This done, he retired a second time.

Hindenburg Becomes President

But in 1925, the Conservatives of Germany asked the old field-marshal, then 78 years old, to be their candidate for president. His sweeping victory caused great apprehension among the former Allies, who knew his devotion to the Hohenzollerns, and feared an attempt to restore the monarchy.

But again Hindenburg surprised the world. His oath of office, he declared, required him to defend and maintain the republic—and so he did, in spite of his personal feelings. He also agreed willingly to all policies designed to reconcile Germany and her former foes, such as the

THE MAJESTY OF UNCONQUERED EVEREST



Of recent years several of the Himalayan peaks have been conquered by intrepid mountaineers, but Mount Everest the world's highest mountain still challenges the adventurous to dare—and, alas sometimes to die. This beautiful photograph was obtained by Mr F S Smythe from one of the camps of the British Everest Expedition of 1936. This camp itself was 20 000 ft above sea level, North Peak, in the centre, is 26,000 ft up, and Everest, the snow tipped peak further to the right, soars another 3,000 ft. into the heavens.

Courtesy of the Mount Everest Committee



HINDENBURG, GERMANY'S GRAND OLD MAN

Hindenburg's spectacular victory over the Russians at the battle of Tannenberg when he was 67 years of age raised him to the position of a national hero. Upon Germany's final defeat he retired into private life, but after the death of President Ebert in 1925 he became the second president, remaining the head of the state until his death in 1934.

Locarno Pact, and entering the League of Nations. But the evident determination of the German people, in despair over their economic condition, to have a dictator, persuaded Hindenburg to give supreme power to Adolf Hitler. Thereafter Hindenburg became virtually inactive until his death in July, 1934.

Hinduism. Of the three hundred and fifty million people in India, more than two hundred millions are Hindus, and the name "Hinduism" is given to their complicated religious beliefs and social customs.

Unlike other great religions it did not, so far as we know, owe its origin to any single person, but seems to have grown up through the gradual changing of very ancient beliefs. When the Aryan conquerors first appeared in northern India, about 1500 B.C. (see India), there gradually arose a series of sacred writings in the Sanskrit called the *Vedas*, these expressed a lofty and mystical pantheism—that is, a belief

in one "divine Being" which included all knowledge and all Nature within itself. This represents the earliest form of Hinduism, since greatly modified.

These Vedas show us this early Aryan society divided into four social castes—the Brahmins, or priestly caste, the Kshatriyas, or soldier caste, the Vaisyas, or farmer class, and the Sudras, or labourers. Early in their history, the Brahmins gained political as well as religious supremacy over the Kshatriyas, and established the religion called Brahmanism, set forth in writings called "Brahmanas," which are commentaries on the old Vedas. Gradually, pantheism gave way to a religion of personal gods, of which Brahma, the "Father of all", Vishnu, the "Preserver", and Siva, the "Destroyer," were the most important.

As the native tribes of India were conquered one by one by the Aryans, the Brahmins found it wise to allow the new converts to retain many of their old beliefs, and primitive religious customs. This has left a permanent mark upon the Hindu religion, especially in Southern India, where primitive customs like animal sacrifice, and superstitious beliefs in demons and local deities still prevail. Opposition to this adulteration of the old religion was in part responsible for the foundation in the 6th century B.C. of Buddhism and Jainism (see Buddha, India), but the Brahmins retained the adherence of the majority of Hindus.

Today, Brahmanism has ceased to exist as a distinct faith, being swamped beneath the mass of popular beliefs and rituals, and later introductions such as Maho-

medanism and Christianity. Scores of sects have grown up, some emphasizing the worship of Vishnu, others of Siva, others of newer gods.

Most of the sects base their practices upon popular religious treatises of comparatively recent origin, called "puranas." At the same time the old four-fold caste system has split into thousands of branches and sub-castes.

Most true followers of Hinduism, however, continue to look upon the Brahmin caste as their leaders, and to observe broadly similar rules regarding food, marriage, and burial. One of the most interesting of the Hindu beliefs is the transmigration of souls, or "metempsychosis." According to this doctrine the soul of a person passes at death into some other creature, either human or animal. If the person has led a good life, the soul goes upward in the scale—a low-caste, for instance, is reborn as a high-caste—but if the person has led an evil life, the soul may pass into the body of a dog or a pig or

HINDUISM

any other animal. As a result of this doctrine, the Hindus believe that during his life a man cannot leave the caste into which he is born, and he must take his wife from the same caste, and his children after him are members of the same caste. To us this seems to mean social stagnation, but the Hindus uphold it on the ground that merit in one life may lead to rebirth in a higher caste. The caste system is thus an integral part of Hinduism. The Greek philosopher Pythagoras put forward a similar doctrine of reincarnation.

Everything in this life, says the Hindu, is a consequence of actions performed in a previous existence, and only by the gradual building up of a fine record of "karma" can final salvation be achieved. This doctrine is a very old one, and was taken over largely by the Buddhists when they split off from Brahmanism.

The Hindu gods are supposed to have undergone a series of incarnations, or "avatars," similar to those through which men must pass. Thus the god Krishna is looked upon merely as a form of the god Vishnu.

Hippopotamus. With its body like an undersized elephant, its little pig's eyes, its broad muzzled head, showing a frightful chasm when it yawns, the "hippo" is perhaps the ugliest mammal in existence. Its great clumsy body, and short stocky legs, would scarcely lead one to think of it as an expert swimmer and diver. But it is more at home in the water than on land.

The name hippopotamus means "water horse," but this African animal is really related to the pigs. The hippopotamus (*Hippopotamus amphibius*) is the largest existing land mammal next to the elephant. The finest specimens of the common hippopotamus measure 12 to 14 feet in length, and about 5 feet or more in height, and may weigh as much as 4 tons. The body is covered with a hide over an inch thick on its back and sides, and is hairless except at the tip of the tail. Its huge red mouth is furnished with large teeth—tusks in the lower jaw. It can close its large nostrils and short ears when under water.

During the day hippopotamuses (or hippopotami) remain in the water, often in herds of

HIPPOPOTAMUS

20 to 40. At times they disappear beneath the water for 8 or 10 minutes at a time, spouting and snorting when they come to the surface. When these creatures are excited or in pain their bodies are covered with drops of a reddish fluid, which gives rise to the saying that the hippopotamus "sweats blood," but blood forms no part of this reddish sweat. At night they feed on water plants and grasses.

They often journey 8 or 9 miles in search of good pasture, and sometimes make inroads on cultivated fields. For this reason they have been exterminated in most settled districts. The natives hunt hippopotami for their flesh as well as for their teeth, which are superior to ivory in hardness. The well-known African explorer, Sir Samuel Baker, says of a wounded hippopotamus, which he saw leave the water and gallop savagely inland: "I never could have imagined that so unwieldy an animal could have exhibited such speed."

Though formerly plentiful in Egypt, the hippopotamus is now found only in equatorial



A. R. Slater

HINDU OF THE HIGHEST CASTE

The Hindus of India are divided into rigid castes headed by the learned Brahmins. Here is a photograph of a Hindu scholar who displays on his forehead the trident of Siva, the mark of the highest of the three classes of the "twice born" of Hindu religion. Notice also the sacred thread which runs over his left shoulder and right hip.



machines, and jewelry. Hire purchase has become so general that many companies have been organized to finance manufacturers and dealers who engage in the business. In practically all cases of hire purchase title to the merchandise or property remains with the seller until the payments are completed, and in this fact we see the chief objection to the system. If the purchaser defaults in even a single payment he may

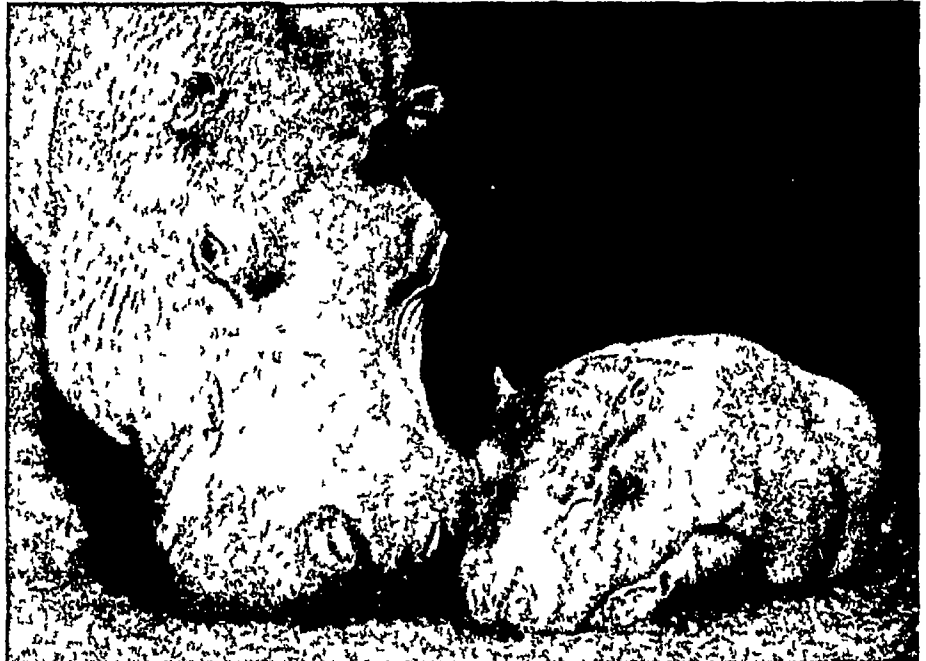
Africa. It is thought that the common hippopotamus was found formerly in the Jordan valley also, and that it is the "behemoth" mentioned in the Bible. It is not difficult to keep in captivity.

Fossil remains of the common hippopotamus have been found even in the north of England, thus showing that there must have been a widespread distribution of the species at one time.

In addition to the common hippopotamus there is a pigmy species (*H. liberiensis*), about 2½ feet high and 6 feet long, which weighs, when full grown, only about 400 lb. This species

is found chiefly in Liberia and neighbouring regions of the West African coast.

Hire Purchase. This is a method of selling by which the seller delivers the property to the buyer in return for the latter's promise to pay the purchase price in regular instalments, or partial payments, over a period of weeks, months, or even years. Hire purchase is one of the common uses of credit. Among the various commodities which are now sold on this basis are books, motor-cars, furniture, pianos, wireless sets, sewing machines, washing



HIPPOS AT HOME AND IN CAPTIVITY

The upper photograph, taken in Central Africa, shows a "wallow" in which the wild hippopotami roll about, covering themselves with muddy water and having, judging by their contented looks, an enjoyable time. Below is a baby hippo, nestling under his mother's snout, in the London Zoo.

The mother and baby are called "cow" and "calf" like the female and young of cattle.

Photos W. F. Taylor F. W. Bond

have to return the goods, though still remaining liable for the balance. An attempt to remedy this and other faults in the system was made in England in December, 1937, when Miss Ellen Wilkinson introduced a Bill into Parliament to regulate hire purchase.

Houses are now often bought through building societies (*qv*), which undertake, in effect, a kind of selling on the instalment system by advancing to the purchaser the greater part of the purchase price of the house, which he returns in regular repayments.

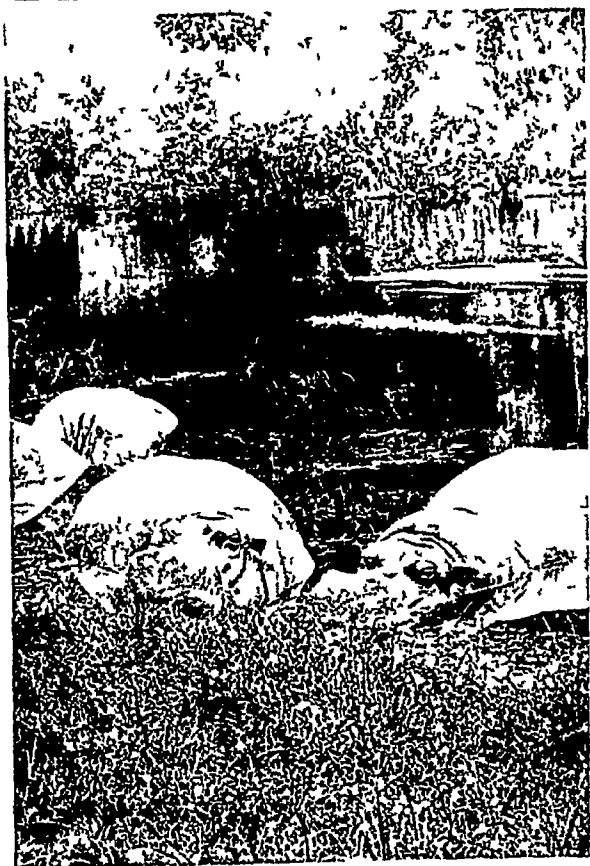
'WIDER, PLEASE'—THE WORLD'S LARGEST YAWN



Even a hippopotamus feels bored at times and this one decided to yawn just when the photographer was about to press the button. So we have a fine view of the inside of his huge mouth armed with great yellow tusk-like teeth. Notice the stiff bristles on hippo's upper lip. His eye is set on a raised brow so that he can still see when nearly every other part of him is submerged.



Photos top Fox left E N A



HIPPOS IN THE HERD

HERE are two photographs of that huge and extraordinary beast, the hippopotamus. Above, a big herd of them are stampeding in a wild, surging mass, terrified as much by the noise as by the sight of the passing aeroplane from which this photograph was taken. Even here you can see their bulky, cumbersome build and huge, rounded snouts. But these features are seen better still in the lower photograph, a close up of some of these beasts having their after dinner nap in the shallows of the Zambesi river. How like they are to huge, half submerged rocks or bunks of timber! Were it not for their bright, twinkling eyes one would hardly recognize them as animals at all. Indeed, it is hardly surprising that in ancient times this beast was regarded as a semi fabulous monster, the 'behemoth' of the Bible.

TRAVELLING BACKWARDS *through* TIME

To our fathers History was among the duller subjects, as it was usually a mere list of dates, kings, and battles But nowadays we know it for what it is—the most enthralling story of all, a tale full of character and incident

History. History, which is another form of the word "story," is a narration of events of the past To read history is to take a voyage through time Like travel, it takes us out of the narrowness and commonplaces of everyday life, and shows us the wonderful panorama or moving picture of Man in his slow ascent from earliest savagery to modern civilization

Someone has said that "History is Philosophy teaching by example" Certainly to be "historically minded" is to see things in relation and in perspective, to judge tolerantly, remembering how differently men have thought and acted in different times, and always to keep an open mind, ready to receive and weigh new evidence If one grasps this idea, it will never be thought that being a historian means just an ability to remember dates

The true historian is not content to take all his facts from other historians He makes sure that his statements are based on sound "documents" or "sources" which go back to the time of the facts themselves Those sources are of all kinds—ruined monuments, old tombs and other material remains, state documents and records, legal papers, letters, diaries, news papers, and written or printed narratives of eye witnesses, even myths and fables, contemporary pictures, drawings, plans, photographs, and the like Sometimes the discovery of the key to new sources adds whole new realms to our historical knowledge

Weighing the Evidence

But the historian needs to be continually on his guard so as not to be misled by his sources A document may be entirely forged, its author may be deliberately lying, he may be so prejudiced by national, religious, party, or personal bias as to be grossly unfair to the other side, and, if honest, he may be misinformed as to the facts and mistaken in his inferences Scores of pitfalls must be avoided by the research worker in this fascinating field

"Criticism for good faith and accuracy," has become a special branch of learning Every trained historian asks, "Did this writer mean to tell the truth?" And second, "Was he in a position, or frame of mind, to tell the truth even if he wanted to?" Every statement, therefore, must be patiently weighed and tested, and combined with all other available information to get at the facts As a result of such training it has well been said that "by the mechanism now at his command, the scientific

explorer can read more history from the dust heaps of Abydos than Herodotus, the greatest traveller of antiquity, could gather from the Egyptian priests of Saïs"

Formerly history was regarded chiefly as a branch of literature, and a pleasing style was considered of first importance Now the emphasis is placed, as in science and other branches of study, mainly upon accuracy of facts, and the soundness and breadth of understanding with which the patient historian presents life as it was lived in the period on which he specializes

The Four Ages of Man's Story

To the long period before written records begin, when Man was taking his first steps in the arts of civilization, we give the name Pre-historic Age (See Stone Age) Ancient history covers well over half the span of our recorded knowledge It stretches from the beginnings of Assyrian and Egyptian inscriptions through "the glory that was Greece, the grandeur that was Rome," to the coming into the Roman Empire of the Germanic barbarians, who overthrew classical civilization (about 3000 B.C. to about A.D. 375)

The Middle Ages extend from A.D. 375 to about 1500 This period starts with an epoch of confusion and transition which lasts to about A.D. 800, to it (if anywhere) the term "Dark Age" may be applied Then comes the height of the Middle Ages, from Charlemagne to Dante (800 to 1300), when feudalism, monasticism, scholasticism, the Crusades, and Gothic architecture flourished, and a world empire and a world papacy confronted each other, and strove for mastery The period closes with a second epoch of transition (1300 to 1500), which we call the Renaissance (See Renaissance) Since 1500 we have the Modern Period, characterized by the organization of national states, the spread of discovery and European settlement, the progress of science and the rise of democracy

When History Began

Written records appear to go back only about 5,000 years Geologists, however, believe that the earth is at least 1,000,000,000 years old, and that Man has perhaps inhabited it for 50,000 years To give some idea of the short duration of recorded history compared with this vast expanse of time, Prof. J. H. Robinson asks us to imagine a library of ten volumes of a thousand pages each, one page for every 5,000 years that the earth has existed The whole



HITLER EXPLAINS HIS PROGRAMME

One of the most striking figures in present-day Europe, Herr Hitler owes his success very largely to his personal appeal. How expressive of whole-hearted devotion are the faces of these young Nazis, engaged in talk with their Leader!

of recorded history from the earliest Assyrian and Egyptian inscriptions to the present day, would scarcely cover the last page of that stupendous work.

If history as a study is often dull and dry, a mere catalogue of names and dates of rulers and battles and treaties, it is the fault of the books and not of history itself. Nothing can be more fascinating than the actual story of how men and women have spent their lives in the past and in far distant lands—their houses, food and clothing, how they cultivated their fields and manufactured goods, and traded with their neighbours, the games their children played, their beliefs about God and the world of Nature, their laws and manner of government, the songs their poets sang, and the beautiful things their artists made. All of this is included in the history which scholars study and teach today.

Even wars and political struggles are interesting, when we once know what they were about, and how they were carried on, and become well enough acquainted with the heroes and leaders to feel that they were real men and women.

The historian Seeley wrote that history and politics are only different aspects of the same study. But this view, equally with the "drum and trumpet" view of history, is too narrow,

and today the historian includes in his survey the whole life of Man in the past so far as it can be discovered from documents and the many other "sources" which shed light on the subject.

Since the time of Herodotus, the Father of History, and of Thucydides the writing of history has been recognized as a distinct form of literature, and the greatest historians have ever since contrived to combine grace of style with strenuous striving after accuracy. Among the Roman authors Livy and Tacitus were pre-eminent as historians. One of the greatest of all writers of history was Gibbon, who in his "Decline and Fall of the Roman Empire" dealt eloquently and ably with a great subject. Among other English historians who have written great works are Macaulay, Carlyle, Froude, Henry Hallam, W. E. M. Lecky and John Richard Green. Two recent outstanding historical works are "A History of England" by G. M. Trevelyan, and "A History of Europe," by H. A. L. Fisher.

For a record in chart form of the world's history from 3000 B.C. to the present day, see the Fact-Index at the end of this work.

Hitler, ADOLF (born 1889) One of the strangest chapters in recent history is the rise of Adolf Hitler from common workman to the position of Chancellor and dictator of Germany.

The "Fuehrer" ("leader"), as he is now universally called, was born in Braunau-am-Inn, Austria, the son of Alois Hitler, an Austrian customs official, and Klara Poelz Hitler, a Bohemian. The details of Hitler's early life are scanty. His autobiography, "Mein Kampf," (my struggle), tells nothing about it. He spent his childhood in Lambach, Austria, and went to Vienna when fourteen years of age to get a job as builder's helper. At eighteen he was left an orphan.

According to his half-brother, Alois Hitler, young Adolf was studious, bookish, shy, sensitive, nervous, and ambitious to become a painter or architect. His mother helped him to obtain some training in water-colour painting. His father, a severe, blunt man, wanted his son to become a government official like himself, but Hitler, in "Mein Kampf," wrote "I did not want to become an official. I hated and was bored by the idea of having to sit tied to an office, of not being master of my own time, of spending the whole of my life filling up forms."

In Vienna, Adolf kept himself alive by sweeping streets, Alois says, and his hardships awakened his mind to social and political problems. Austria was a country of many races, and Hitler, feeling himself a thorough German, looked longingly across the border at the powerful, energetic German nation.

Driven by poverty, until he thought of it as "a poisonous snake", imbued with a fanatic sense of his German nationality, and deeply prejudiced against Jews, Hitler already carried in his mind the seeds of his later political doctrines, when he left Vienna for Munich in 1912. In Munich he worked as carpenter, architect's draughtsman, and water-colour painter. There the War found him.

He enlisted as a private on August 3, 1914. He served on the Somme, was made lance-corporal, and won the Iron Cross for the perilous service of acting as runner between the front line and regimental headquarters. He was twice wounded, gassed, and temporarily blinded. When he returned to a much changed Munich, he joined the German Workers' Party, and his gifts as an orator soon made him a leader.

In 1920 he designed the swastika (crooked cross) flag as the party emblem and organized the "Storm Troops" to prevent any interference with his meetings by his enemies, the Communists. The name of the Party was changed to National Socialist German Workers' Party (*Nationalsozialistische Deutsche Arbeiterpartei*), abbreviated to "Nazi" (pron. naht'-si). The Nazis gained ground so fast that, on November 8, 1923, aided by General Ludendorff and his Nationalist followers, they attempted to gain control of the Government by the "Beer Hall Putsch," so called because groups of Nazis went from beer-hall to beer-hall seeking followers. Hitler was arrested and sentenced to five years in the fortress of Landsberg am-Lech. There he wrote "Mein Kampf," now regarded as the "bible" of the Nazis. He was released after he had served only eight months of his sentence.

The years from 1924 to 1928 were prosperous for Germany, and revolutions seldom flourish on prosperity. But with the depression the Nazis' chance came. Hitler himself, having smarted at German defeat in the War and gone hungry in poverty, was in the closest touch with German thought and feeling, and his oratorical powers enabled him to play skilfully on the emotions of the masses. He salved national pride by blaming war defeat on Jews and Marxists, and promised a return to order.

In 1930 the number of Nazis in the Reichstag had grown to 107, supported by nearly six and a half million voters. Two years later they polled over thirteen million votes, winning 230 seats. Then came a check, but on January 30, 1933, Hitler was called to be Chancellor by the old President. When Hindenburg died in 1934, Hitler combined in his own person the offices of Chancellor and President.

Immediately he began to convert the republic into a "totalitarian" state, in which all the power was vested in his own hands, directed through the trusted members of his party. The local government of the states comprised in the Reich were largely suspended, and Germany became one as never before. In the summer of 1934, a number of Nazi chiefs, who had fallen from favour, were summarily shot in what was called a "blood purge."

Then, step by step, Hitler broke the shackles imposed on Germany by the Treaty of Versailles. At first in secret, and then openly, he directed the country's rearmament, and in 1936 the occupation of the demilitarized zone of the Rhineland became the prelude of a series of events of far reaching importance that culminated in the declaration of war by Britain and France. (See Germany.)

Hittites. When the tribes of Israel entered Palestine after their long journey from Egypt, they found many peoples living there, and among them were the Hittites, a race similar in appearance to the Hebrews, who reached great



HITTITE SCULPTURES

Carchemish was an important stronghold of the Hittite confederacy, and reached its zenith in the 13th century B.C. Excavations there have revealed sculptured reliefs of gods and royal personages. This photograph shows the figure of a god taken from the palace of Carchemish, and is a typical example of the Hittite conception of divinity.



A HITTITE ROYAL FAMILY REJOICES

This remarkable bas-relief is one of those found in the Hittite city of Carchemish. It shows a Hittite king and his children marching from the palace to greet victorious troops. The royal children are represented in the upper part of the double panel walking in solemn procession, but those in the lower part are engaged in the more congenial occupation of playing games. Last comes the nurse carrying the baby and leading a pet lamb, whose name is inscribed above it.

From Woolley and Hogarth's 'Carchemish,' British Museum

power in the near East before fading away into obscurity. Apart from several mentions of them in the Bible they were unknown to modern scholars until their monuments and inscriptions were dug up by archaeologists—a work in which Professor Garstang, of Liverpool, has played a leading part.

The Hittites are first heard of about the year 2500 B.C., when they still occupied their original home country in Asia Minor. From there they spread southwards and eastwards. In 1925 B.C. they sacked Babylon, and brought to an end the first Babylonian dynasty. Subbiluluma, the Great King of the Hittites, came to the throne about 1400 B.C., and by his efforts added greatly to the consolidation and strength of the Hittite Empire. During his reign the Hittites invaded the far-flung boundaries of the great Egyptian empire, and we find a later Hittite forming an alliance with the Egyptian pharaoh. But attacks from the Assyrians, and from the so-called sea-peoples—the Thracians, Phrygians, and Armenians—first weakened and finally overcame the Hittite empire, and Carchemish, the capital, was vanquished by the Assyrian king, Sargon II, in 717 B.C. This may be said to mark the end of the Hittites, for their kingdom was gone, and their civilization became a fading memory.

It is one of the great benefits of archaeology that it shows us not only the warlike but also

the domestic life of ancient peoples. From the work of the spade we have learned a great deal about Hittite civilization. From their inscriptions, which have only in part been deciphered, we know that they were well organized and administered politically, and that they had a code of laws much milder and humane than the Assyrians and Israelites. They mostly followed agricultural occupations, and were expert in raising cattle and keeping bees. Their religion was very involved, and they worshipped many gods. Some elements of their culture, such as the use of a silver coinage, seem to have been borrowed from the Babylonians.

Hobbies. Educational authorities are agreed that every child—and every grown-up, for that matter—should take up some useful or instructive hobby in his or her spare time. The person who seems bored and at a “loose end” when out of school or office has probably never tried any such leisure occupation.

The modern boy is interested mostly in mechanical and scientific things—railways, may be, or ships or aeroplanes or motor-cars, or the strange marvel we still call wireless (qv). The making of simple models of some of these things is described under the heading of Models.

Many children of both sexes are extraordinarily clever with their hands, and are able to fashion the most beautiful objects out of the most unpromising raw material.

Then there are those to whom collecting something, or making a "scrap book," makes an instant appeal (*See Collecting, Stamps, etc*)

Some boys and girls are never really happy unless out by themselves studying natural history in their own way—learning all they can about trees, flowers, birds, animals, and the beauties of the countryside generally. No one could imagine a more healthy and useful hobby than this (*See Nature Study*). The care of domestic pets (*see Dogs, Pets, etc*), is another very worth-while occupation.

The young amateur scientist—be he chemist, physicist, or budding biologist—often knows a surprising amount about subjects which did not even exist in his father's day. Photography (*qv*) is a particularly absorbing pastime, calling for the exercise of a great deal of patience, care, and ingenuity.

You can hardly call games a hobby, yet many people treat them as such. Certainly, bodily fitness is an excellent goal at which to aim. "Off duty" exercises for the mind, such as the crossword puzzle, are the mental "daily dozen" for a lot of busy people. Others never seem to stop reading, either for pleasure or for study.

A lot of hobbies (particularly those of the "arts and crafts" type) can be made by the clever ones to bring in money, but a genuine hobby is one pursued for pleasant instruction rather than pecuniary profit. Sometimes, however, a hobby followed in youth becomes, in later life, a real career. The lessons learnt at school become a sort of general educational background, and the lessons learnt out of school—and perhaps picked up with greater enthusiasm—form the basis of useful life's work (*See also the article on Leisure*).

Hobbs, JOHN BERRY (born 1882) One of the greatest cricketers of all time, "Jack" Hobbs first played for England in 1907, and did not make his last appearance in Test Matches until 1930. He achieved great fame as an opening batsman, and was the mainstay of Surrey, his adopted county, over the same period. The Hobbs Gates, erected in 1934 at the entrance to the Oval ground, are a lasting memorial to his genius. Perhaps the climax of Hobbs' career was in 1925, when he surpassed W G Grace's record of 126 centuries in first class cricket, and scored no fewer than 16 centuries during the season. In 1930 Hobbs beat another of Grace's records—"W G's" aggregate of 54,896 runs. Hobbs was also a great fieldsmen at cover-point.



JACK HOBBS

J B Hobbs, of Surrey and England, is usually ranked second only to Dr W G Grace as the greatest batsman who ever lived.

Hockey. This game is played by both men and women in the winter months, and its popularity in this country is on the increase. Among women especially it is a favourite pastime, although there are many large and flourishing men's hockey clubs. "Mixed" hockey is popular, for there are not many games which men and women can play together.

It is unlikely, however, that hockey will ever oust football, as a game or as a spectacle, from its pre-eminence as the king of winter sports. Hockey has not the same appeal to the average spectator as football, and except at international contests, held yearly, and at the annual Varsity match, a large crowd of enthusiastic onlookers is something of a rarity.

It seems likely that the word "hockey" has some connexion with the "hooked stick" with which the game is played. Exactly how the game came to be introduced into this country is unknown. According to one authority, it originated in France in the 14th century, but it is more than likely that modern hockey is but a variation of a similar game that the Romans of old played. It is certain, at least, that the game grew and developed in England. There is a similar game in Ireland known as hurling, in Scotland as shinty, and in Wales as bandy.

In some form or other hockey has been, and still is, played in most parts of Europe and Northern Asia. Originally, it was undoubtedly very rough, and it was discouraged in many quarters for this reason.

In 1875 the Men's Hockey Association was formed, and eight years later rules were drawn up by the Wimbledon Club, since then, the game has been improved, until it has become the skilful, scientific and pleasing exhibition we see played everywhere today.

Rules of the Game

There are eleven players on each side, as in football, namely, a goalkeeper, two backs, three half-backs, and five forwards, and the object is to score by hitting the ball into the opponents' goal. Each player has a curved stick, made of ash, the handle of which is usually about 2 feet in length, and the blade 1 foot long. The end must be rounded—not pointed, or cut square. The head of the stick is smooth—sharp edges are not allowed—and the surface of the face of the stick is flat. The total weight of the stick, including that of any protective binding, must not exceed 28 ounces.

Occasionally the game of hockey is played with a solid rubber ball, but more often a white



HOCKEY 'SNAPSHOTS'

Above are typical incidents in this popular winter game (1) the bully, (2) a tussle for the ball, (3) play in the "circle", (4) goal-keeper clearing, (5) mid-field play

Below right, the field of play

leather ball is used, or a cricket ball painted white

It is common for the players, especially the goal-keeper and the backs, to wear shin-guards. The "goalie" usually wears, in addition, pads and other protection.

Anyone with a good knowledge of the laws of football will find little difficulty in following the laws that govern the game of hockey. A player cannot be off-side if he is in his own half of the field, if the ball was last touched by one of the opposing side, or if there are three opponents between him and the goal-line.

In the act of striking the ball, the player must not raise his stick above his shoulders. The penalty for "sticks" is a free hit. To start the game, the centre-forward of

each team strikes the ground on his side of the ball, and his opponent's stick above the ball, three times alternately, after which either is free to strike the ball, which is then in play. This procedure is called the "bully."

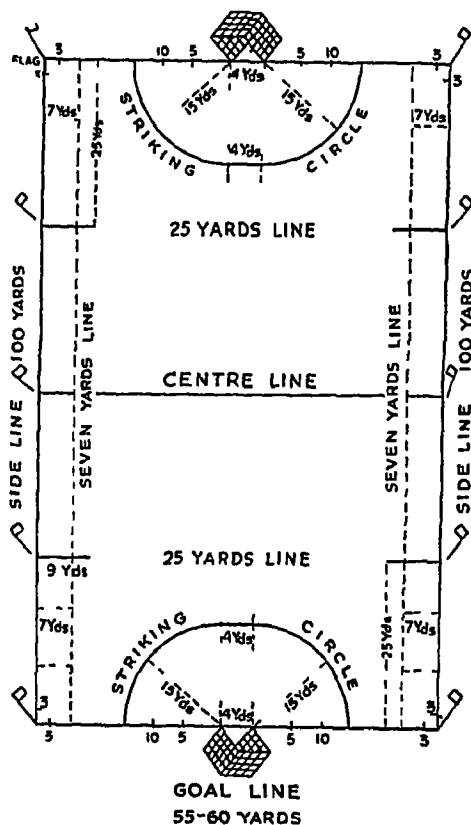
Where a "foul" occurs in the striking circle (see below) the referee awards a "penalty bully" or a "penalty corner," either of which offers a reasonable prospect of a goal. In taking a penalty corner the ball is hit from the goal-line at any spot at least ten yards from the nearest post, all the defending players being meanwhile behind their goal-line, and the remainder of the attacking side outside the circle. A goal may be scored only from within the striking circle.

The measurements of the hockey field are as follows: length, 100 yards; breadth, 55 to 60 yards. Touch-lines are called the "side lines" and "goal lines." A line is drawn 7 or 5 yards inside and parallel to the side-lines. In front of each goal a line 4 yards long is drawn parallel to the goal line. The ends of this are carried round a curve, forming a quarter circle, until they reach the goal-line at a point 15 yards from each of the goal posts. This semi-circle is called the "striking circle." Goals are 4 yards wide, and 7 feet high.

Hogarth, WILLIAM

(1697-1764) Few men have had a keener eye for the expressions that the human face is capable of registering than the English painter and engraver, William Hogarth. No artist has reproduced those expressions with more biting irony. Charles Lamb calls Hogarth "perhaps, next to Shakespeare, the most inventive genius which this island has produced."

Hogarth was primarily a humorist and satirist, using his paints and engraving tools as Molière and Fielding and Swift used words. He has been called a master of caricature, and he did contribute greatly to the





HOGARTH 'SHOWS UP' THE LIFE OF HIGH SOCIETY

Hogarth satirized many aspects of life in the 18th century, and one of the most famous of his series of paintings is that called "Marriage à la Mode" which exposes the follies of the fashionable life of his time. The sprawling young nobleman and his yawning bride sit amid the disorder left by a large party, while the steward makes a gesture of despair at the sheaf of bills he holds in his hand. In the effectiveness of its colour and composition, this is one of Hogarth's most successful works.

Tate Gallery, Millbank, London

development of technique in this field. But a caricaturist, in the modern sense of the word, usually ridicules individuals by exaggerating their conspicuous features. Hogarth rarely dealt with individuals. Rather, he made fun of humanity as a whole, satirizing its weaknesses and vices.

In his own day, however, many critics called Hogarth "vulgar," and thought his art inferior. Now he is generally placed high in the history of English art for his masterly technique, his originality, his superb rendering of costume and setting, and, above all, for the vital humour and trueness to life of his characters. Most of his works are stories on canvas or copper, though he also did some excellent portraits (see page 1505).

As a boy, Hogarth showed a remarkable gift for mimicry, and drawing. He tells us that his exercises at school "were more remarkable for the ornaments which adorned them than for the exercise itself." He was apprenticed to a silver plate engraver, and at the age of 22 set up as an engraver for himself. Soon he began to paint portraits and groups, and eventually found his

true sphere in ridiculing human folly. His practice was to make a series of paintings, and from them engravings, which were sold by subscription. Because printsellers shamelessly "pirated" his engravings, Hogarth was largely instrumental in securing the passage of an engraving copyright act.

Among Hogarth's famous works are the series "The Harlot's Progress" (1731-32), "The Rake's Progress" (1735, Soane Museum, London), "Marriage à la Mode" (1745, Tate Gallery), and "The Election" (1755-58, Soane Museum).

Holbein, Hans (Pron hōl-bīn) (1497-1543). In the days when Luther was drifting into his revolt against the Roman Catholic Church, Hans Holbein, a young German artist, left his father's studio in the wealthy old cultured city of Augsburg, to seek his fortune in Basle, Switzerland. His purpose was to furnish illustrations for the wonderful new printed books that were there being published.

The busy Rhine city of Basle boasted, in those days, "at least one learned man in every house."



HOLBEIN'S PORTRAIT OF THE ROYAL ASTRONOMER

In his early thirties the great German painter, Hans Holbein, paid his first visit to England, and during his stay painted a number of portraits of the most eminent men of the time—portraits which are generally held to show his powers at the full. Above we see one of them, it is of Nicholas Kratzer, astronomer to Henry VIII, and is now in the Louvre.

Among these scholars was the famous Erasmus, who had come to Basle to oversee the publication of the first printed edition of the New Testament in the original Greek, and other works which he had edited. This wise man and the young artist at once struck up a friendship, and Holbein drew pictures for a very clever satire, called "The Praise of Folly" (*Encomium Moriae*), which Erasmus had written for relaxation, and which his friends persuaded him to publish. The pictures were as clever as the text, and through all the 400 years since that time, whenever "The Praise of Folly" has been reprinted, Hans Holbein's drawings have been reprinted with it.

Holbein drew illustrations for many other books, among them Martin Luther's translation of the Bible into German. He displayed

great skill, further, in painting portraits and miniatures and religious subjects, he designed stained-glass windows, he even drew designs for women's costumes! The old saying that artists are born and not made must have been true in the case of Holbein, for without a magic gift from some good fairy he could hardly, at the early age of 20 years, have excelled in so many arts.

After a time Holbein, with a letter from his friend Erasmus to an Englishman of influence, again set out to try his fortune in a strange land. In London the young painter met with a favourable reception and on a later visit he painted the famous series of notabilities about the court of Henry VIII, which you may have seen reproduced, and which are still at Windsor Castle. The king's fondness for Holbein has passed into a legend. When a nobleman complained of the favour shown the base-born artist, the king said "My lord, know that of seven peasants I can easily

make seven earls, but of the seven earls I cannot make one Holbein!"

Another account of his services at the court of Henry VIII relates that he painted the portrait of the king, "life size, so well that everyone who looks is astonished, since it seems to live as if it moved its head and limbs."

Although his life was spent in Switzerland and England, Holbein is regarded as a German artist. Comparing him with the other master artists of that nation, it is said "Durer was the greater genius, a greater thinker, a greater engraver, but Holbein was the greatest painter Germany has ever produced."

His paintings and drawings are found in most of the larger galleries of Europe, but to see his work at its finest you need go no further than

our own National Gallery, where you can marvel at the superb poise and dignity of his "Duchess of Milan" Holbein is often known as Hans Holbein the Younger, for his father, too, was a fine painter

Holidays AND FESTIVALS Holidays have been observed in every age and among practically all peoples. The Greeks had their Olympic games and many other festivals. The Romans celebrated Lupercalia in the spring, and Saturnalia in mid-winter, marked by games, fantastic amusements, and the giving of presents. The earliest of all festivals seem to be connected with the dead, to whom offerings were made. Later, the sun and moon or the seasons were recognized by festivals, seed-time and harvest were occasions for special rejoicing.

All early festivals were in some measure religious. Thus the word holiday was originally "holy day." Political holidays, celebrating historical events, are of later growth.

In England and Wales the public holidays are Easter Monday, Whit Monday, the first Monday in August, and the first weekday after Christmas Day (Boxing Day, when "Christmas boxes" used to be given to local tradesmen). Banks are closed then, and on Good Friday and Christmas Day. In Scotland the Bank holidays are the first Monday in May and the first Monday in August, Good Friday and also Christmas Day and New Year's Day, or the first weekday after, if these fall on a Sunday. Bank holidays may also be proclaimed on days of public rejoicing.

The institution of Bank holidays was due to John Lubbock, M.P., afterwards Lord Avebury, who in 1871 secured the passing of the Bank Holidays Act.

Of late years there has been a demand for "holidays with pay" in many of our industries, and in some the grant of a week is now the rule.

In Lancashire and the North, in towns largely engaged in one industry, all the works close during the same week, and tens of thousands of holidaymakers descend upon Blackpool or the Isle of Man for a week's merriment. This mass-holidaying is called a "wake."

Holland. For centuries Holland and Belgium were combined in the one state called the Netherlands, being known as the Northern and Southern States of the Netherlands, respectively. In 1839 they were finally separated by

a rebellion on the part of the Belgians, but the country we call Holland retained its former name, and is officially known as the Kingdom of the Netherlands. In this work it is described under the heading Netherlands.

Holly. This is probably the best-known of all our trees, for there is no mistaking it with any other, and at Christmas time every household in the land has holly for ornament. Those rich green, shining, spiny-edged leaves, and those great bunches of scarlet berries, belong to no other tree, and by them, at one season or another, you may know the holly (*Ilex aquifolium*). But sometimes, as for instance at the tops of the taller hollies, you may see leaves whose margins are almost completely smooth, only the end of the midrib terminating in a sharp spine. This, naturalists will tell us, has possibly something to do with the fact that these particular leaves grow on shoots far out of reach of any cattle or horses which might want to eat them, so they need none of the protecting spines, without which leaves growing within reach of the ground would all be eaten!

The holly flowers are small and white in colour and they appear quite early in the year.



HOLIDAY MAKERS ON BLACKPOOL BEACH

Blackpool is the most popular of all the seaside places in the North of England. The week during which all the factories in one town are closed is called 'wakes week,' and here is the scene on the beach at Blackpool during an invasion by thousands of people from a North Country manufacturing town.



Harold Bastin

HEDGEROW HOLLY

The holly is really a woodland tree, but it is so strong that it is often planted in hedges. Here an example has been left when the hedge has its annual trimming, and is now a small tree. You know the holly by its evergreen, spiny-edged leaves.

They are of two sorts, male and female, and some trees are without the latter—that is why you may have a holly tree in your garden, and yet never see any berries. Often, the berries are ripe at the same time as most other fruits, namely in autumn, while in other seasons they may still be on the tree when spring comes round again. The reason for our using holly berries for Christmas decorations is rather a strange one, and not Christian at all! For these were used for decorations in ancient Rome, at the Saturnalia, when all Romans

exchanged greetings with their friends. This feast happened about the same time as Christmas does, so the early Christians living in Rome exchanged the same emblems of good cheer as pagan neighbours, and this habit spread later throughout the Christian world.

The holly is not often a large tree, although it may grow to be a very ancient one. English hollies are, as a rule, the finest in size, and



HOLLY BERRIES

Known by everyone as the chief Christmas-tide decoration, holly berries often ripen in autumn, and sometimes in the spring.

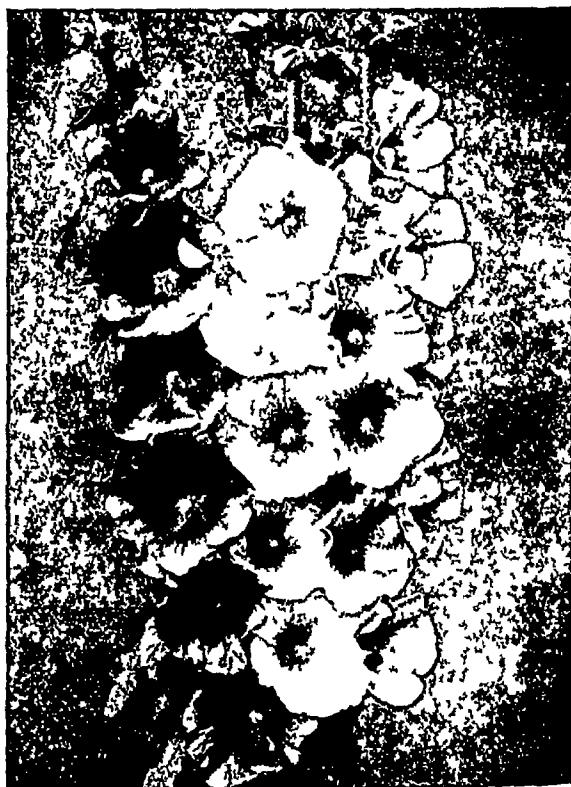
(Photo A. H. Dennis)

the tree grows especially well in our oak and beech woods, standing the shade of its great companions better than almost any other tree. The wood is hard, close-grained—for the tree grows slowly—and white in colour. It is not much used now except for small work, but formerly was a popular wood in English native furniture, being often dyed green or black to imitate ebony. Straight young shoots of holly make, perhaps, the finest and strongest of all walking sticks.

The holly has, too, a butterfly of its own, the little holly blue, pale grey-blue with black tips to its forewings, you may see it in early spring or late in summer, flitting around the trees on whose flower buds the caterpillar feeds, it also eats the flower-buds of ivy.

Hollyhock. Clothed with dark green leaves and thickly studded with large bright-hued blossoms, the tall stalks of this treasured, old-fashioned plant make a beautiful and stately border for our gardens. Reaching a height of six or eight feet, its spikes stand in soldierly array, seeming to guard the more modest blossoms that cling closely to Mother Earth.

The hollyhock (*Althaea rosea*) has been developed from a species of wild mallow, native to Syria. It is believed to be the "holy mallow" discovered by the Crusaders and brought to Europe by way of Palestine. Originally it had



FINE HOLLYHOCKS

One of the favourite old English garden flowers is the hollyhock, and, unlike others popular in former days, it is still well-loved in any garden. But it is not always that you can grow such fine ones as these, with their rows of flowers all opening together and all equally perfect.

single, rose coloured blossoms, but through centuries of cultivation numerous varieties of both double and single flowers have been produced, in many shades of pink and purple, as well as in yellow and white. The fruits, like those of other mallows, look like little flat, round packets, and country children still call them "cheeses."

Holmes, OLIVER WENDELL (1809-1894) Of American authors who have won a large reading public on this side of the Atlantic, one of the most famous is Oliver Wendell Holmes. His best known work is "The Autocrat of the Breakfast Table," a volume of essays, witty and wise, humorous and kindly. He followed that success with two other books of the same kind, "The Professor at the Breakfast Table" and "The Poet at the Breakfast Table." He also wrote two novels, and poetry.

Dr Holmes's success as a writer was the more remarkable because writing was not his chief business. He was a busy physician and Harvard professor, who, besides caring for a big practice, made original scientific investigations and wrote medical works. He was born in Cambridge, Massachusetts, U.S.A.

His fame as a writer began while he was still at college, with his poem "Old Ironsides," which was instrumental in saving the old frigate, Constitution, from destruction. The volume that contained the funny "My Aunt," and the humorous pathetic "Last Leaf," appeared in the year that he took his M.D. degree at Harvard.

Holy Orders. When a man is a clergyman, or a recognized minister of a Free Church we say he is in "Holy Orders."

The method of entrance into the clerical profession depends partly upon the church which a young man desires to enter. For this purpose churches may be divided into four groups: (1) The Church of England, with which may be included the disestablished episcopal churches in Ireland and Wales, and the episcopal church in Scotland; (2) the Free Churches of England and Wales; (3) the Presbyterian Churches, one of which is the established Church of Scotland; and (4) the Roman Catholic Church.

A young man wishing to enter the ministry of the Church of England, may graduate at one of several Universities and then obtain a curacy, and is presented to the bishop of the diocese in which he is to serve for ordination. In some cases a short course is taken at a theological college in addition.

The candidate for ordination must not be under twenty-three years of age. He is ordained first as a deacon, in which capacity he serves for a year, and then as a priest. If the candidate does not go to a university, he may take his whole training at a theological college. There are various organizations, both central and diocesan, to give financial help to suitable candidates who have not the necessary means. There are several colleges of the Church of England for training in missionary work.

Training for the ministry of the Free Churches of England and Wales is usually obtained in a theological college, such colleges being maintained by the leading denominations in various parts of the country. In some of these colleges, a university degree is a necessary preliminary to the course of study. A suitable course of preparation for missionary work is available in many of these colleges. The ordination service is simpler, and there is no second ordination.

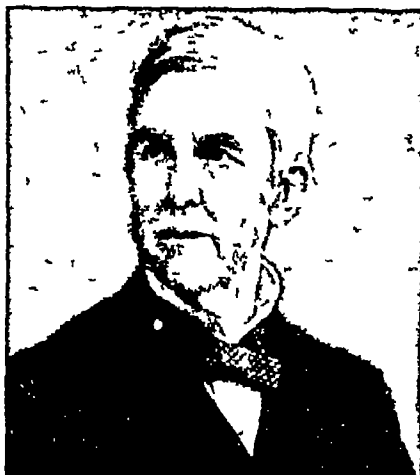
The Presbyterian Church demands a very high standard of education for its ministers. The usual course of training lasts six years, the first three

in obtaining a university degree, and the last three at a theological college. The Church of Scotland has three theological colleges.

For the Roman Catholic priesthood, it is customary for the candidate to enter a junior seminary soon after the age of fourteen. At about the age of twenty he enters a senior seminary, where the theological training is carried on. This often lasts about six years. A Roman Catholic priest is not allowed to marry. **Holy Roman Empire.** On Christmas Day of the year 800, Pope Leo III, in the church of St. Peter's in Rome, placed a crown on the head of the Frankish King, Charlemagne, as he knelt in prayer. It was then that the organization which we call the Holy Roman Empire first came into existence. (See Charlemagne.)

A few years later, through the break-up of the Frankish kingdom after Charlemagne's death, the Empire for a time disappeared. It was revived by the Saxon Otto I, king of Germany, in 962. From that time until its final abolition in 1806, the Empire maintained some sort of existence, but in its last three centuries it had become, in the language of Voltaire, "neither holy, nor Roman, nor an empire."

In theory the Holy Roman Empire was the counterpart, in civil government, of the universal



OLIVER WENDELL HOLMES

Perhaps the only American essayist of world wide fame, Oliver Wendell Holmes, the 'Breakfast Table' author, is as widely read on this as on his own side of the Atlantic, for a kindly humour shines through his delightful writings.

Catholic Church in religion Just as God had placed the Pope over His Church, so, it was reasoned, he had placed the emperor over all kings and princes In practice, the Empire after 962 included only Italy and Germany, and a wavering connexion with Lorraine, Burgundy, Switzerland and the Netherlands

In theory again, the Empire was elective The Golden Bull of 1356, issued by the Emperor Charles IV, placed the hereditary right to elect in an Electoral College composed of the Archbishops of Mainz, Cologne, and Treves (Trier), the King of Bohemia, the Count Palatine of the Rhine (Pfalzgraf), the Duke of Saxony, and the Margrave of Brandenburg (Bavaria and Hanover were added later) In practice the Empire was virtually hereditary in some one princely house, though election sometimes took place

After the Carolingian and Saxon lines, the imperial crown was worn by the members of the following houses the Franconian or Salian house (1024-1137), the Hohenstaufen (1138-1254), [Great Interregnum, 1254-1273], various houses (1273-1347), the Luxemburg-Bohemian line (1347-1437), the Hapsburgs (1438-1806, except for one reign, 1740-1745)

From the foundation of the Holy Roman Empire by Charlemagne in the year 800, until the 16th century the story of the Empire is mainly concerned with Germany, and with the Popes, and Italy Its history in the 16th century became almost entirely merged in the history of Germany This German phase lasted into the middle of the 17th century, when the

Empire became Austrian, and Austrian it remained until its final disappearance in the early years of the 19th century (For details see the article Germany, and the articles on the various emperors and statesmen) /

Home Office. One of the most important Government Offices, and one that closely affects our daily life is the Home Office It is presided over by the Home Secretary, who is the senior of the eight Secretaries of State As such he is in close relation with the Sovereign, who issues through him all communications to his subjects and takes his advice as to pardoning those convicted of crime

The Home Secretary signs the death warrant of those condemned to be hanged Until the reign of Queen Victoria the warrants were signed by the Sovereign, but the Queen found this duty so distasteful to her that it was transferred to the Home Secretary

Convicted prisoners can appeal to the Home Secretary for a reprieve, and he may, if he thinks fit, advise the Sovereign to exercise the prerogative of mercy

Many of the former functions of the Home Office have been taken over by other departments, but it is still responsible for the Metropolitan Police and has a limited control over other police forces, all prisons are under its jurisdiction The inspection of factories and mines is carried out by Home Office officials, who also administer the laws relating to aliens, the licensing of hotels and public-houses, burial laws, fire brigades, and many other matters

Homer. There is no greater name in poetry than that which stands for the unknown author or authors of the famous epics of Greece, the *Iliad* and the *Odyssey* According to the ancient historian Herodotus, Homer was an Asiatic Greek who lived about 850 B C But the Greek historians themselves differ as to where he was born, thus giving rise to the saying

Seven cities contend for Homer dead

Through which the living Homer begged his bread

Tradition pictures him as a blind old man, who wandered about reciting his poems

Many scholars, however, hold that the poems were not composed by a single person, and were not written until centuries after they took the form in which we know them It is almost certain that they were long handed down from



THE HOME OFFICE IN WHITEHALL

One of the most important of the great Government departments is the Home Office, which deals with a thousand-and-one matters of importance to every inhabitant of England Above we see the imposing building in which it is housed It is in London, facing the Cenotaph in Whitehall

memory, as there is little evidence that writing was practised in Greece at so early a period

One theory of their authorship is that they are the work or compilation of a company of poets or minstrels, who composed, collected and handed down in this form the legends of the Trojan War. Sometimes they are attributed to different writers sometimes to earlier and later periods than Homer's

But the question of the authorship of the *Iliad* and the *Odyssey* is of little importance beside the poems themselves, which are the greatest epics of any age or country. Later poets, both ancient and modern, and in all lands have paid homage to the master, whom Tennyson called "the Ionian father of the rest"

The *Iliad*—from *Ilium*, one of the names of Troy—describes the events of a few days in the last of the ten years of the war between the Trojans and the Greeks. Paris, a Trojan prince, had gone on a visit to Menelaus, the King of Sparta, and while there had fallen in love with Helen, wife of Menelaus, and reputed the most beautiful woman in the world. Paris persuaded Helen to run away from her husband and go to Troy with him, and, when Helen refused to return, Menelaus called upon the other princes of Greece to avenge his injury, and thus began the war. Achilles was the great warrior on the Greek side, and Ulysses was also a Greek famous for his wisdom.

The Greek war about Troy forms the basis of the poems. The *Iliad* tells the story of "the wrath of Achilles," while the *Odyssey* relates the many adventures of Odysseus (Ulysses) on his voyage home. Even though the poems contain only a shadow of historical fact, scholars owe a great debt to them for the information they furnish concerning early life in the lands about the Aegean sea. Excavations by Schliemann and others on the site of Troy and elsewhere have abundantly confirmed the



HEROINE OF HOMER'S *ILLAD*—HELEN OF TROY

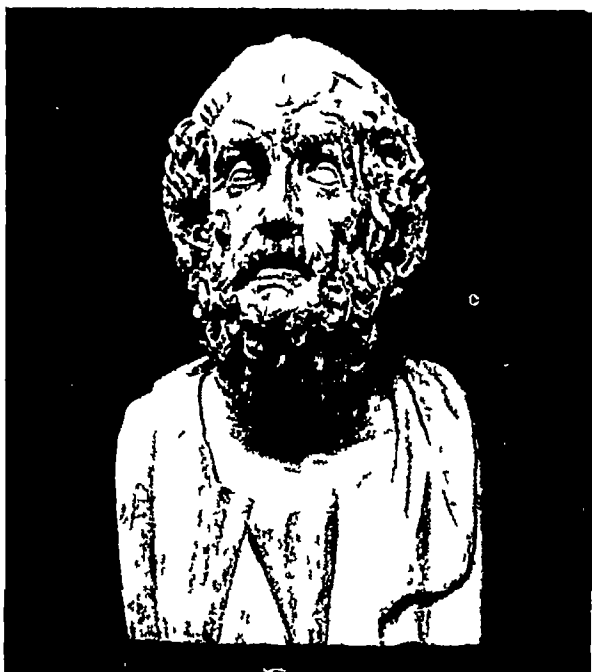
It was of Helen, said to have been the most beautiful woman who ever lived, that Marlowe made his Dr Faustus speak those famous lines "Was this the face that launched a thousand ships, And burnt the topless towers of Ilium?" This was a reference to the fact that she caused the Trojan War (*Ilium* was the Greek name for Troy). Helen is here pictured as walking on the walls of Troy.

After a painting by Lord Leighton P. R. A.

information from the poems (*See Aegean Civilization*, Schliemann, Heinrich)

One does not need to be a scholar to appreciate the wonderful stories in Homer. The boy or girl who reads the poems in translation or paraphrase cannot miss the charm of the stories, as he or she reads through the stirring battle scenes of the *Iliad* and through the many and strange adventures of the *Odyssey*. Only the student of the Greek language, however, can fully appreciate the simple and lofty beauty of the style of the original.

Homer has been translated into English verse by George Chapman (whose translation in turn



A SCULPTOR'S CONCEPTION OF HOMER

There is, of course, no authentic portrait or bust of Homer but in this bust (now in the National Museum at Naples), a sculptor of Ancient Greece has given his impression of him. Very little is known of the man himself, indeed, some scholars have asserted that he never existed!

Photo Anderson

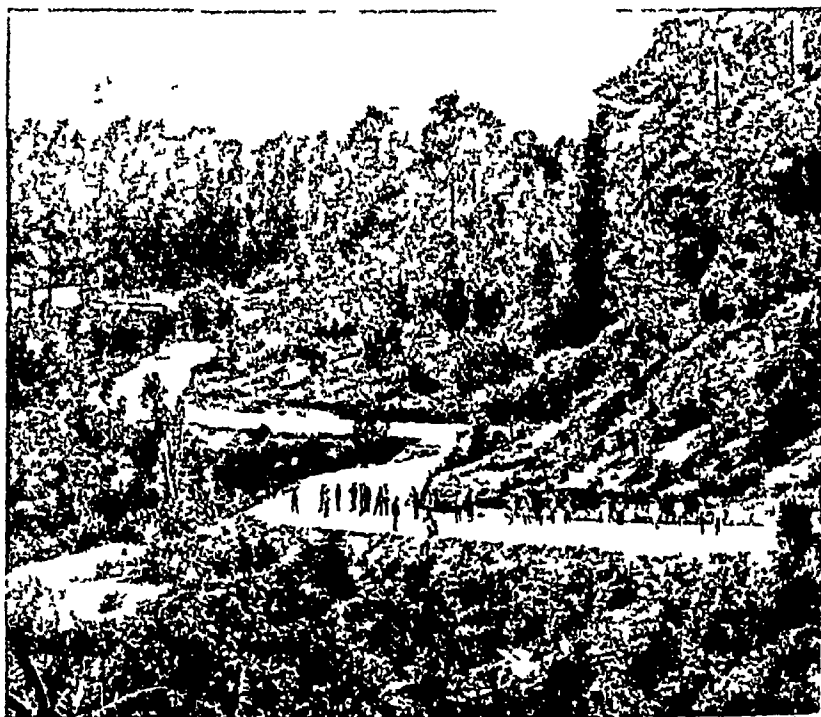
inspired Keats to write a famous sonnet), Alexander Pope, and William Cowper. Of these, Pope's translation is the least readable, for it departs at times widely from the original, and reflects the mind of Pope himself rather than Homer's. The *Iliad* has been translated into prose by Lang, Leaf and Myers, and the *Odyssey* by Butcher and Lang, and these versions probably give the best idea of their original. The *Iliad* and *Odyssey* have also been translated into English prose by Samuel Butler, and the *Odyssey* by "Lawrence of Arabia" (See Achilles, Circe, Cyclopes, Hector, Odysseus, Trojan War).

Hondur'as. The history of Honduras goes back to the days of Christopher Columbus, who was sadly battered by the waves off its coast in 1502, but this Central American republic is still one of the least developed regions in the New World. In spite of its great mineral wealth, fertile soil, great forests, and other natural resources, few vessels visit its low, swampy, fever-stricken Caribbean shore

except the banana boats that ply to New Orleans and Mobile, or tramp steamers seeking cargoes of logwood, mahogany, or hides. The chief centre of settlement is on the Pacific.

A steamer brings you to the Gulf of Fonseca, one of the finest natural harbours in the world, and comes to anchor off Amapala, on Tigre Island, the Pacific gateway to the republic. From Amapala a motor launch will carry you to the mainland, where starts the 85 mile highway to Tegucigalpa, for this healthily situated capital, with 47,075 population, is the only capital in Central America which still lacks railroad connection with the coast. You will find this a city of low white houses with tile roofs, lying in the bend of a small river and surrounded by beautiful, wooded hills.

A rough journey of many miles, over mountainous roads northward from the capital, brings you to the terminus of the one important government railway in Honduras, it runs inland from the harbour of Puerto Cortez on the Caribbean Sea, and some day will connect the Atlantic and Pacific coasts. In the interior the climate is healthy, and the high plateaux are dotted with small cattle and pig farms. In the warmer valleys fine coffee and tobacco are raised. The chief crop is bananas. Other crops are maize the staple food of the people, beans, rice, wheat, sugar cane, coconuts, henequen (sisal hemp), and indigo. Hides, rubber, and ivory-nuts are among the exports. Gold,



L. N. A.

IN THE REPUBLIC OF HONDURAS

The surface of the Republic of Honduras is chiefly mountainous and the vegetation is luxuriant. Communications are poor, but in recent years two great roads have been constructed—the Carratera del Norte and the Carratera del Sur. This photograph shows a small part of the winding course of the Carratera del Sur which runs 85 miles inland from the Pacific Coast.

HONDURAS

silver, copper, iron, coal, and other minerals are abundant, but development has been slight.

The population is chiefly of Spanish and Indian descent, with a mixture of negro and Carib blood on the north coast. In some of the less explored regions dwell Indian tribes, little more civilized than were their ancestors when Columbus sailed by.

The first European settlement in Honduras was established by Hernando Cortez in 1524. For three centuries it shared the fate of the other Spanish provinces in America. Since independence was gained, revolutions and civil wars have been frequent. In 1907 United States marines were compelled to intervene at the close of a disastrous conflict with Nicaragua. In recent years the government has shown a tendency to encourage agricultural and commercial development, and to provide better protection for foreign investments. As a result new railway construction was started.

The area of the republic is 46,250 square miles. Most of the surface is mountainous, with heights ranging from 5,000 to 10,000 feet. Its population is about 965,000.

Honduras, British. Formerly called Belize, this British crown colony was founded early in the 17th century, at the lower end of the Yucatan peninsula, by poachers in the Spanish logwood forests. Conflicts with Spain lasted until 1798, and it was only after the revolt of Central America from Spanish rule that Great Britain's rights were clearly recognized. The southern

HONEYSUCKLE



E. J. Bedford

THE FRAGRANT HONEYSUCKLE

Few summer flowers are so beautiful as the honeysuckle, and few have so attractive a fragrance. This picture shows not only the curious form of the flowers themselves, but also the thin straggling stems and simple leaves of this common wayside plant.

portion of the colony is elevated, the hill ranges being a connecting link of the Cockscomb Mountains to the north and the mountains of Central Guatemala on the south. More than

two thirds of the country is forest land, which produces pitch-pine, mahogany, logwood and other timber, while bananas and coconuts are grown. The higher parts provide pasturage, but much of the country consists of swamps and lagoons. There are 25 miles of railways. The chief river is the Belize, which is navigable by small boats. The climate is generally damp and hot. Area, about 8,598 sq miles, population, about 55,000, capital, Belize (population, about 16,000), which was visited by a disastrous hurricane in 1931. Belize is a stopping place on the Pan American weekly air-mail, and there is an air passenger service to Miami.



CHIEF TOWN OF BRITISH HONDURAS

It is easy to tell that Belize is situated in the tropics, for the white roofs and the luxuriant palms growing among the houses speak of heat and, in this case, of moisture too. For it is the capital of a very damp land famous for its dense forests and especially for mahogany. The river here has the same name as the city.

Honeysuckle. Clinging tightly to neighbouring plants in tangled rock woodland, or winding its way



HONG KONG AND ITS HARBOUR

The island of Hong Kong is a British possession of great commercial and strategic importance, and its natural harbour is one of the finest in the world. The top photograph shows the harbour and the town of Victoria, the capital of the island. In the lower photograph is the hull on which are the houses of wealthy residents.

Photos E.N.A. Keystone

up the sides of fence or garden wall, the sweet-scented honeysuckle, or woodbine (*Lonicera periclymenum*), abloom with yellowish-white or pinkish trumpet-shaped flowers, is indeed a pretty sight. But you must remember these berries are poisonous. There are over a hundred species of honeysuckle, growing wild or under cultivation, scattered through the Northern Hemisphere, many of which you may now see in English gardens. One well-known variety, the evergreen or trumpet honeysuckle, that bears scarlet or yellow blossoms in the spring, is a North American plant. Especially beautiful is the Japanese honeysuckle that opens its buds only in the evening. The snowberry, which you know by its little pink flowers and big, waxy white berries, belongs to the same order, *Caprifoliaceae*.

Hong Kong, CHINA In less than a century the island of Hong Kong, England's first outpost in China, has been transformed from a desolate nest of pirates into one of the most important shipping and business centres in the world. Lying opposite the mouth of the Canton River, on the south-east coast of China, this island, with its series of magnificent natural harbours, is the great clearing point for the commerce of the Far East.

Ships flying the flags of all the western nations mingle there with Chinese junks, Malay proas, and other strange

craft of the Orient The number of vessels, big and little, going in and out of this port in one year amounts to nearly 50,000, representing over 40,000,000 tons of shipping Their cargoes include tea and silk, sandal wood, ivory, opium and other products of the east for export to the west, and machinery, locomotives, sails, coal, petrol, textiles and other manufactured goods for import The centre of this thriving commerce is the settlement at the north-west corner of the island, officially called Victoria, better known to sailors the world over as the city of Hong Kong It stretches for five miles along the north shore of Hong Kong Island and its streets rise terrace upon terrace up the sides of Victoria peak, which dominates the main harbour from a height of 1,825 feet From this peak can be traced the fine military highway, 22 miles long, which encircles the island Here and there on the rocky cliffs are placed batteries of frowning guns Across the mile-wide strait is the Kowloon peninsula, jutting out from the mainland, which also forms part of the British colony of Hong Kong Everywhere along the shores of bays and inlets you see strings of houseboats and rafts where lives the Chinese "floating population" of about 100,000

Hong Kong island, which is 10 miles long and from 2 to 5 miles wide, was ceded to Great Britain by China in 1841, following the Opium War The Kowloon peninsula was added in 1860, and in 1898 Great Britain obtained a 99 years' lease of 356 square miles of agricultural lands stretching along the coast behind the town of Kowloon

The colony (total area 391 square miles) is ruled by a British Governor and an Executive and Legislative Council Hong Kong has a university and numerous schools for Europeans and Chinese There are many fine public buildings, palatial hotels and business houses The main streets, De Vaux Road and Queen's Road, are broad highways laid out in the best Western style The recreation grounds and public parks at Happy Valley are equal to anything there is in London The chief industries are cotton spinning, sugar-refining, shipbuilding, rope making, and stone-quarrying

Important fisheries are established on the mainland Hong Kong is also the headquarters of the China squadron of the British Navy Population Chinese, 950,000, non Chinese, 21,000

Hood, THOMAS (1799-1845) 'There was a dash of ink in my blood,' was the explanation given by this inimitable punster and poet for his youthful adoption of a literary career His father was a Scotsman, who had a bookseller's business in the Poultry, in the City of London, and who devoted his spare time to fiction and other writing Thomas Hood began to follow in his father's footsteps at an early age, and was writing for the papers and magazines before he was out of his teens

Thomas Hood—who was born in London May 23, 1799, and died there May 3, 1845—is one of the most delightful punsters in English

literature The fountain of fun was always bubbling up in his writings, which were for the most part in verse Many of his comic verses, like "Miss Kilmansegg and her Precious Leg," and "Ode on a Distant Prospect of Clapham Academy," can still be read with delight, but Thomas Hood is chiefly remembered to-day for his famous "Song of the Shirt," published in "Punch" in 1843, which exposed the hardships endured by the sweated sempstresses of his day

Hooker, SIR JOSEPH (1817-1911) If the Zoo is a paradise for animal lovers and students of zoology, the choicest site of study for botanists in London must be Kew Gardens But few realize that they owe practically entirely the continued existence of the Gardens to the great Sir Joseph Hooker, who was Director of Kew from 1865 to 1885 For it was he who, backed by public opinion, saved Kew from becoming a mere recreation ground when it was transferred from the control of the Forestry Department to that of the Office of Works But Hooker was more than the saviour of Kew, he was the most distinguished botanist of an age that produced Darwin, Lyell, and Huxley, and he was almost as travelled as an explorer Scarcely any part of the world was unvisited by Hooker, who is, however, best known for his classic "Student's Flora of the British Isles" which, in its later



HOOKER AND HIS RHODODENDRON

The man whose portrait you see above is Sir Joseph Hooker, one of the most famous of botanists On the right is the Sikkim rhododendron, a fitting memorial to this great man For this plant, now so popular all over England was introduced by him.

form, written with his friend George Bentham, is known as "Bentham and Hooker"

Hooker's principal achievement concerned the study of the geographical distribution of species, and the importance of his work on this subject may be gathered from the words of Darwin to Hooker "I shall live to see you the first authority in Europe on that grand subject, that almost keystone of the laws of creation, geographical distribution" Hooker's, Darwin's, and Lyell's work was intimately interconnected, inspired by Lyell's discoveries, Darwin looked for the origin of species, Hooker for their method of distribution. The ideas of "evolution" and "natural selection" came to them all about the same time, as they came to A R Wallace, then living on the other side of the world, and it was Hooker who took the most important part in persuading Darwin to announce his theory to the Linnean Society on that epoch-making day, July 1, 1858. Moreover, Hooker, in one of his books, published in August, 1859, first stated in print the theory which Darwin did not give to the world (as "The Origin of Species") until November of the same year.

Possibly most interesting of all his achievements to the ordinary Nature-lover was his introduction to Kew of that lovely plant, the Sikkim rhododendron.

The value of Hooker's work did not go unrecognized. In 1873, at the age of 56, he became president of the Royal Society, in 1877 he was knighted, in 1907, on his ninetyeth birthday, he was presented by King Edward with the Order of Merit, he also held many foreign honours. He died on December 10, 1911, actively working to the end.

One of Sir Joseph's last great public appearances had been at the 50th anniversary of Darwin's announcement of his theory of the origin of species to the Linnean Society. Darwin's prophecy had come true, Hooker was

"the first authority" on his subject—first both in time and in the importance of his conclusions, and if, as Darwin claimed, the study of geographical distribution is the keystone of the laws of creation, Hooker has the best claim to be the prime architect of the modern science of natural history.

Hops AND HOP-PICKING When the green cone-like blossom-clusters of the hop-vine take on a yellow tinge, and rustle like paper flowers,

the hop grower rushes his pickers into the field, for the value of his harvest depends on gathering this flower fruit in the nick of time. The yellowish, aromatic, resinous substance called "lupulin," which is contained in the fruit, deteriorates rapidly, and it is this substance which gives hops their medicinal and industrial value. That is why, if you live in a county where hops are grown—in Kent, or Hampshire, or Worcestershire—your neighbourhood may suddenly be swamped with hundreds of strange folk, chiefly women and children. These people, the "hoppers," are brought down from the East End of London each season. Though they live in the town, they are experts at their job, for every year they make this same pilgrimage, and long experience has taught them the quickest ways of gathering the bunches of fruit from the tall, leafy "vines."



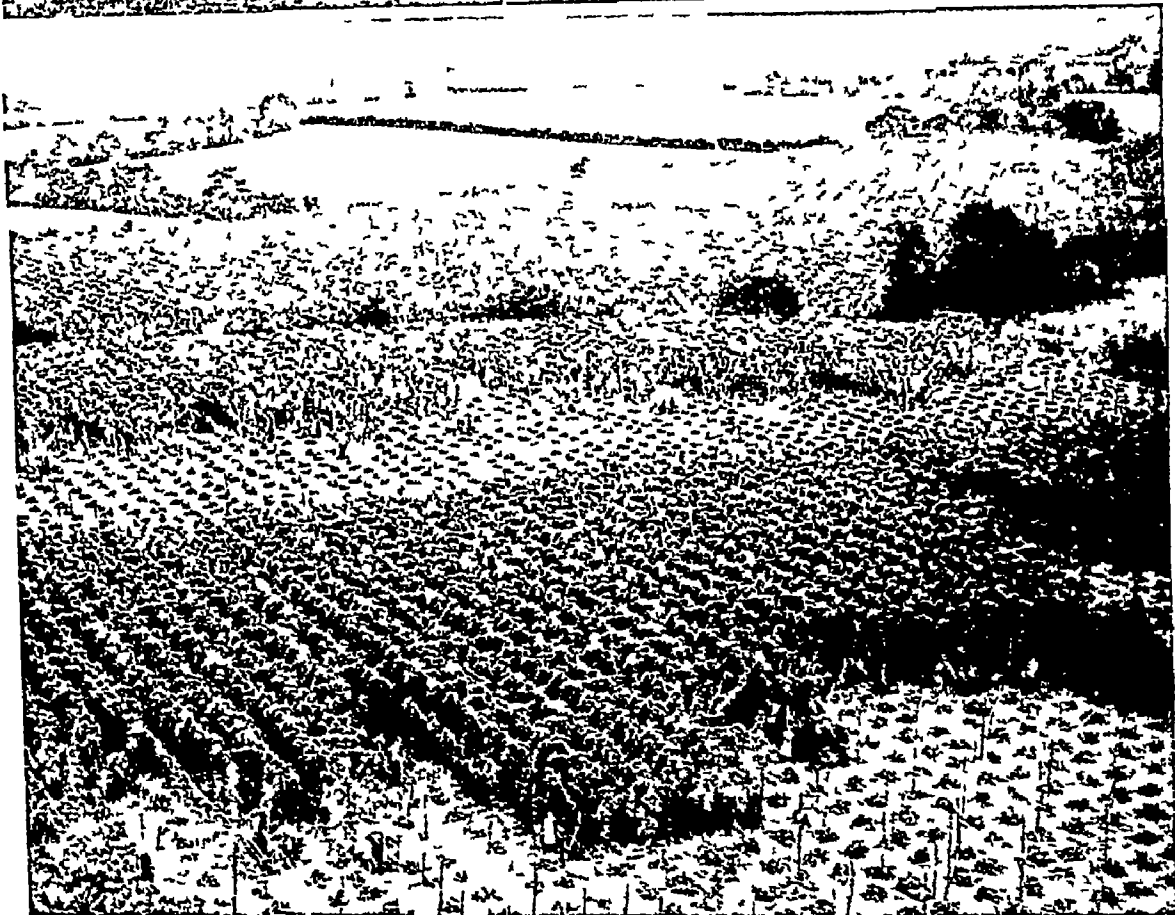
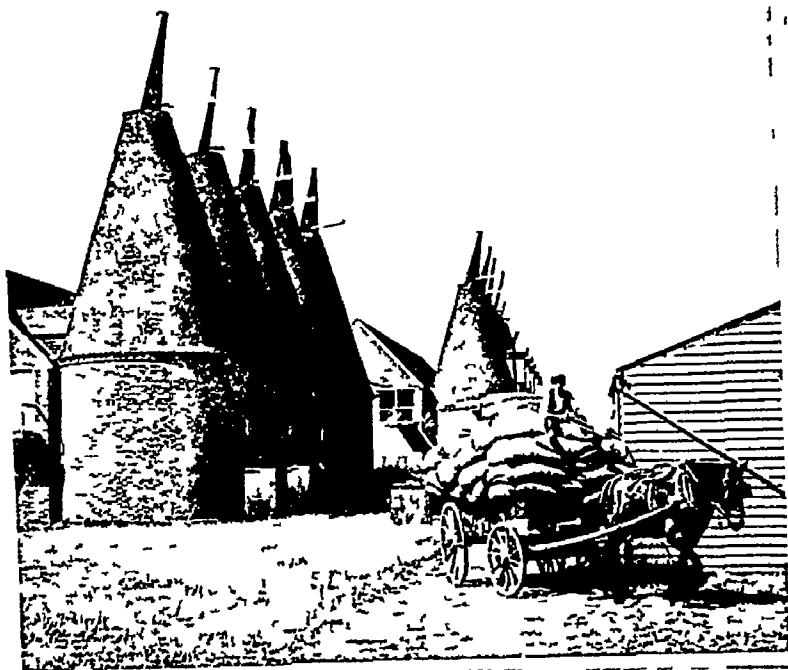
RIPENING HOPS

These hops are now rapidly ripening, as you can see by the size of the oval clusters, rather like masses of flattened grapes. The hop leaves, coarse and deeply-lobed, are characteristic of this creeper, and one can often see them growing wild in the hedgerows. Like the stems, they have numerous hooks to enable them to cling to other vegetation.

The common hop (*Humulus lupulus*) is a perennial climber, which each year produces several twisting stems that reach a length of 15 to 20 feet, it belongs to the nettle family, and has lobed, heart-shaped leaves and insignificant, greenish flowers. The vines do not grow horizontally, but cling to upright poles or wire. Hop vines always twist in a right handed spiral.

There are male and female plants, but the best hops come from fields where only female plants are grown. This prevents seed production, which would detract from the value

SCENES IN THE HOP GARDENS OF KENT



Here are three scenes such as you might see any day if you visited the Kentish hop gardens during the summer when the hopping season is at its height. At the top (left), in front of a row of 'oast-houses,' the buildings in which the hops are roasted, you see a cartload of hops being taken away for making into beer. The right-hand picture shows the "stilt man," who walks about in this strange fashion in order to tie the tallest shoots of the vines over the highest wires. Just how huge and complicated a big hop garden may be can be gathered from the fine photograph below, an aerial view of a garden near Tunbridge Wells. Yet for all the density of the planting, those are well organized lanes along which the pickers are working.

Photos: The Times Sport & General Topical

of the fruit. Plants grown from seed are not true to type, therefore, hops must be propagated by root cuttings or by sets.

The principal use of hops is in making beer and other malt beverages. Bohemian hops are noted for their excellence, and Germany, France, and Belgium also produce them. In the United States, the principal hop fields are in New York, and on the Pacific coast. The common hop, too, is widely distributed as a wild plant in England. The production of hops in England is now regulated by the Hops Marketing Board, in an effort to make hop-growing more remunerative for the home producer by stabilizing prices at economic levels and preventing seasonal gluts.

Horace (QUINTUS HORATIUS FLACCUS) (65-8 B C) There is nothing new under the sun, and the youth of Horace, the great Roman poet, born more than 2,000 years ago, has many points of resemblance to the life of an

ambitious scholarly boy in our own time. He was born on a farm in Southern Italy, within the Roman Empire, December 8, 65 B C. His father was a pushing man of business, although of humble birth, and by occupation a collector of the taxes. Out of his savings he had purchased a small farm, and when his son, the future poet, was born he determined to give him the best education possible. There is many a father of a bright boy today who willingly makes great sacrifices in order that his son may have a better chance in life than he himself had. This the father of Horace did. He sent his son to the equivalent of our public schools and universities in Rome and in Athens, and, by his thrift and good management, kept Horace in a position where he could associate as an equal with the sons of the highest people in Rome. Not only did this wise father see that no social or intellectual advantage was withheld from his promising son, he also, by precept and example, sought to develop in his boy a noble character. That Horace was not ungrateful for all his father did for him is shown by the tributes he pays to his father's memory in his writings. In his writings Horace tells us, too, that at least one of his teachers believed in knocking instruction into his backward pupils with the cane, so that, altogether, the future poet was a very human boy.

Horace settled in Rome, and there soon won fame by his verses. He also gained the friendship and patronage of the wealthy Maecenas, upon whom in return he bestowed immortality, for the name Maecenas is widely used

to this day to denote a rich man who helps literature and learning by his wealth. Horace's poetry is famous for two reasons. In the first place he displayed unsurpassed dexterity in handling Latin verse. Secondly, his writings reveal a shrewd philosophy of life, a calm judgment of men and motives, and a smooth and polished wit in exposing folly and wickedness.

It is the greatest tribute that can be paid to his genius to say that today, 2,000 years after his birth, acquaintance with his poems—as we have them in his odes, his satires, and his epistles—is an essential part of a classical education, and "Horatian Style" a term of praise.

There are innumerable English translations of Horace, for many poets, scholars and lesser men have tried to recapture his charm in our language. None has been wholly successful, but perhaps the least unsuccessful on the whole were the versions of Professor John Conington.

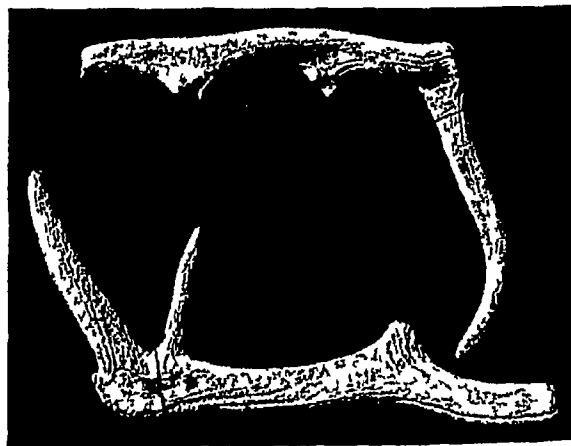


HORACE

A brilliant poet and satirist, Quintus Horatius Flaccus was one of the greatest Latin writers.
From Bernoulli "Röm. Ikonographie"

Horn. There are two kinds of horn, one the continued growth of bone, the other a hardening of the epidermis. Corns that grow on our toes, the hard spots on a camel's knees, the tortoise's shell, the scales of snakes and lizards, birds' beaks, horses' hoofs, the horns of sheep and cattle, and the finger- and toe-nails of men and beasts, are the latter, or true horn. It is closely related in growth and composition to hair.

The deer's horns, or antlers, are examples of the other kind of horn, which is really a bone outgrowth (See illus. p. 1240). During the growing period such horns are covered with a sensitive skin, —aptly known as "velvet"—which later peels off.



British Museum

HORNS USED AS DIGGING TOOLS

Here are two antlers, found in the famous "Grimes' Graves" flint mines in Norfolk, where they were used by prehistoric men for excavating flints. Once—many, many thousands of years ago—these horns adorned the brow of red deer that in those days were widely distributed over Britain.



leaving the hard, solid antlers. These are usually shed once a year. Beneath the sheath of true horn in the case of oxen, sheep, and antelope, we find frontal bone outgrowths constituting a core. Except for those of the prong horn antelope, such horns are never shed. Neither are those of the graffe and the rhinoceros, which are thickened hardened masses of skin and hair, covering independent bones. Horns may be solid or hollow, in the latter case they are usually found on the female as well as on the male.

Primitive men used horn for weapons, drinking cups, and handles, then later for powder horns and musical horns. Since true horn can be softened and split into thin sheets which are tough, pliable, and easily moulded, many articles both useful and ornamental have been made from it. By a dexterous mixing of dyes, common horn can be made to look like expensive tortoise shell. Formerly thin horn plates were used in window panes and lanterns,

and horn is still used in making combs, buttons, and handles for umbrellas, canes, knives, and forks.

Horns AND TRUMPETS

The first horns used in music were rams' horns. From these natural hollow tubes it was a short step to hollow tubes of brass. In time these were improved by the addition of valves, worked by keys that shortened or lengthened the tube, thus making it possible to produce any note of the scale. By varying the shape and width of the tube, of the mouthpiece, and of the bell (the flare at the end), various types have been developed.



HORNS OF HUNTSMEN AND SHEPHERDS

The penetrating note of a horn depends to a great extent on the instrument's length. The upper illustration above shows a hunt in France in the reign of Louis XV. The huntsmen carry horns having a great length of tube, which is coiled in a wide circle so that the horn can be carried over the shoulder. The lower picture shows an alpenhorn, a wooden bugle used by the Swiss shepherds and cowherds to communicate with one another at great distances.

In the modern orchestra only the French horn is technically called a "horn." The trumpet, cornet, and trombone are spoken of as "trumpets." The powerful tubas are the tenor and bass instruments of the brass group. The saxhorns, which are chiefly used in military bands, are keyed instruments with long winding

HORNS

tapering tubes, made in several sizes. They get their name from a Belgian, Adolphe Sax (1814-94), who invented them. The euphonium is a small bass instrument of the saxhorn type.

Each of these instruments has its own interesting history and its own distinctive quality. The French horn gets its graceful shape from the fact that it was once a hunter's horn. Straightened out, it is from seven to ten feet long. Imagine a hunter riding to the chase with such an encumbrance! The tube of the horn was bent in a circle large enough for the hunter to slip over his head, and in this way he carried it to the chase.

The trumpet's brilliant and penetrating voice is due to its long, narrow tube eight feet in length, it is only $\frac{3}{8}$ inch in diameter until within fifteen inches of the bell.

This tube is usually bent back upon itself to make it more convenient to handle. The circling,

or bending, of a tube makes no difference in the tone, so long as the air space inside is left undisturbed. The trumpet is very difficult to play, and therefore the cornet often takes the place of the trumpet.

The cornet is the smallest of the brass instruments generally employed, for its four-foot length is bent into a short space. For all its small size, it is the most important member of many brass bands, and fills a useful place in the orchestra. Its characteristic feature is its three pistons, which vary the length of the vibrating air-column and thus enlarge its compass.

The sliding trombone is the curious instrument that the performer plays by pushing a slide in and out of the "horn." The player skilfully lengthens and shortens the tube, to make the different notes, in this instrument the slide replaces the keys.

Although the tuba is the deepest voiced of all the brass instruments, it produces rich tones, and its great voice can be made both soft and sweet. Its long, cone-shaped tube is bent and rebent before it finally ends in the great flare that gives it such a look of weight. Like the cornet, it is played by valves.

The saxophone, an invention of the same man who invented the saxhorn, is a strange instrument of brass, fitted with a mouth-piece containing a reed, like the clarinet. It is an important instrument of military bands, and is always employed in modern dance bands.

Hornbill. A great beak, surrounded by bony crest or helmet, and prominent eyelashes distinguish these queer, bulky birds (*Bucerotidae*) of Africa and the Malay region. Their food consists mainly of fruit and insects, but those of the larger species (about four feet long), kill and devour the largest and deadliest vipers.

The hornbill breeds in holes in trees, plastered up with mud by the male until only a small



THE WEIRD BLACK HORNBILL FROM WEST AFRICA

Of all the birds found in the Old World, surely the hornbills are the weirdest and most wonderful. Found in the widely-separated African and Malayan regions, they are especially remarkable for their huge beaks, ornamented on top with a sort of horny crest. No one has yet discovered the reason for this crest, which, in spite of its weighty appearance, is actually more or less hollow and adds little to the weight of the whole. Whatever its value to the bird, it makes its owner an object of laughter to the human mind.

window remains
Through this he passes
food to the female and
young

The bird flies very slowly, its unwieldy body and even weirder beak being awkward loads to carry. What is more, no one knows the purpose of the vast beak, which is not so heavy as it looks, having numerous air-spaces and being lightly constructed.

Hornets. When you hear someone say that they have seen a wasp "so big it must have been a hornet," you will know that they are wrong, and have not seen a real hornet at all. For not only is the hornet brown and yellow, whereas the wasp is black and

yellow, but, moreover, the worker hornet is very much bigger than any wasp, even a queen wasp



FULL-FACE PORTRAIT OF A HORNET

The hornet is one of those insects that commands immediate respect, not only on account of its sting but also because of its fearsome buzz and its size. Here highly magnified, is a full-face view of a hornet clutching a twig. You can see the huge jaws and the great compound eyes directly outside the antennae. Notice, too, the strongly clawed feet.

since it is most unwise to undertake a close investigation of a hornet's nest!

In general behaviour and mode of life, however, hornets do resemble wasps, and they actually belong to the same family (*Vespidæ*) and genus, the hornet's scientific name being *Vespa crabro*.

If their nests are attacked, they show so irritable a disposition, and wield so painful a sting that the expression "a veritable hornet's nest" is quite justified.

In Britain these insects, which are common only in certain districts, do a certain amount of good in killing other, harmful insects. They nest, almost invariably, in hollow oak trees, but this is a fact you will have to accept without proving it for yourself,

The FAITHFUL SERVANT of MAN

Horses have been put to greater useful service by Man than any other domestic animal, from pulling the plough in peace to carrying the cavalymen in war. This article traces their history before they became Man's servant.

Horse. The horse and other members of the same family, the ass and the zebra, are especially interesting because scientists have



been able to trace their history more completely than that of any other animal group. So many fossil skeletons of horses have been discovered, in all parts of the world, that we know the history of its development for a vast period of time—2,000,000 or 3,000,000 years, or even more. We know that the remotest ancestral horse

was a small animal about the size of a cat, with five toes on each fore foot and four on each hind foot.

Fossil remains of early horses (named *Eohippus*, or "dawn horse") have been found with four complete toes on the fore feet and three on the hind. As we follow down the series of fossil skeletons, we can see how these little

animals took to running on the tips of their toes to escape their enemies, and how gradually they came to throw more and more weight on the centre toes. With each generation, therefore, these toes became stronger, and the unused toes became weaker and finally disappeared. (See *Evolution, Foot*)

That is why the horse now has only one toe on each foot. The hoof which encases it is just a greatly enlarged and thickened toe nail. Traces of two of the lost toes may be found in the splint bones which grow on either side of the cannon-bone of the foot. The upper joint of the toe has also become much larger and stronger. It is known as the "fetlock." The joints that are usually called the knees of the horse correspond to the ankles and wrists of a human being. The true knees and elbows are concealed within the body of the horse, but they may be seen clearly when it is in motion.

The horse has a symmetrical form, strong limbs, a long head with large lustrous eyes, small pointed ears which it can move, and wide open dilating nostrils. The neck is long, the body rounded and fleshy, the hair is soft and short,

and lies close to the body, growing into long coarse strands in the mane and tail. The mane falls in graceful waves down one or both sides of the neck and over the face. The tails of the ass and the zebra are tufted at the ends, but in the horse the long hairs grow from the base and sides as well as from the tip, and may therefore be several feet in length.

The horse eats grass and grain, but does not chew the cud. It has from 36 to 40 teeth—three incisors, or cutting teeth, and six grinders on either side of both jaws. The grinders (molars) are peculiar in that they grow up from the gums as fast as they wear off at the crown.

The dog-teeth, or canines, make their appearance, but only in the males, during the fourth year, and at five years the set of permanent teeth is complete.

The growth and changes in appearance of the teeth are so regular up to the tenth year that the age of the horse may be judged by them. During its second year the colt's hair loses the curliness which distinguishes its first season, and becomes more lustrous. The hair, except the mane and tail, is shed annually in the spring. In the autumn it grows longer for the winter.

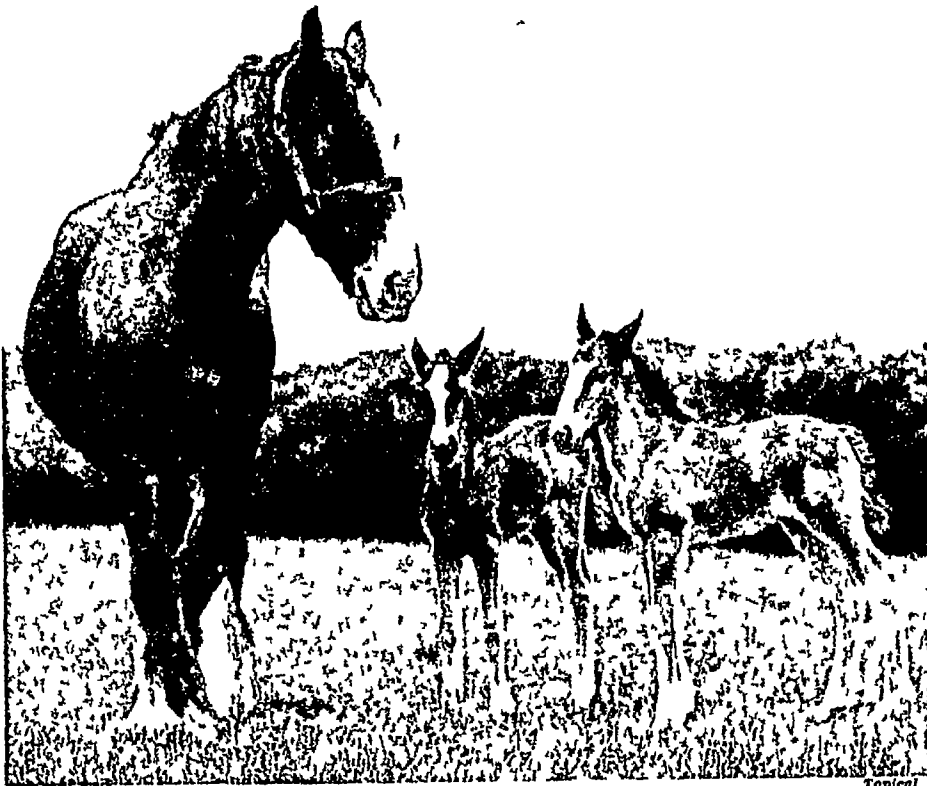
From the piles of horse-bones found in the haunts of the early cave men, we know that the

wild horse was first pursued for food. As a tamed servant of Mankind the horse was unknown to Egypt of the Pyramid Age (3000–2500 B C), and to the Babylonians before 2100 B C. The first to tame the horse were Aryan (Indo-European) peoples who inhabited the vast grass-lands that stretched north of the Caspian Sea and the Black Sea.

All the early monuments and records indicate that for many centuries the horse was used chiefly to draw chariots in war. As beasts of burden, the ox and the ass were used long before the horse.

Several animals similar to the ass are still found wild in Central Asia, such as

the "kiang" and "onager," but the only wild horse is Przevalsky's horse, which occurs still in herds on the Mongolian plateau. This is a small, shaggy, pony-like animal, its tail being of the ass, not the horse, type. Zebras and wild asses are also found in Africa, in the deserts of Syria and Persia, and in the central plains of India. (See Ass). When white men first went to America, the horse was entirely unknown to the natives, and increased their awe of the newcomers. The wild horses later met with in South America, and the mustangs, or Indian ponies, which, until quite recently, ranged wild over a great part of western North America, are descendants of



PROUD MARE AND HER DAINTY FOALS

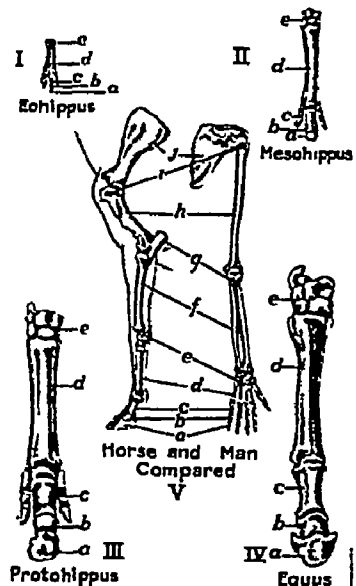
The very young horse is always called a foal, becoming a colt after six months or so. Unlike many of the larger animals, it is a most active creature almost from birth. Although usually not very well able to run much for a day or two, it attempts to do so a few hours after birth. As is shown in this photograph, the foal has legs out of all proportion to its general dimensions, this is because, in order to escape from its enemies in the wild state, it must be able to run for considerable distances and at a good speed even when very young.

In addition to these the males have four small canines, or dog-teeth. Between the canines and the grinders there is a space where the bit is placed, an arrangement by which alone Man has been able to subdue this vigorous animal. The life of a horse is 18 to 20 years.

The foal, or baby horse, is born with its eyes open and its body fully covered with hair. It is able to stand and walk a few minutes after birth. Within two weeks the "nippers," or central teeth, make their appearance. Other teeth soon follow, and when the colt is about six months old it has a full set of milk-teeth, which it begins to shed during its third year.

THE HORSE AND SOME OF HIS ANCESTORS

That little creature at the very top was the first of all horses. He lived ages and ages ago and was about the size of a cat. *Eohippus* we call him today and from his remains we learn that he had four toes on his front feet and three on his hind feet and that he must have looked very much as the artist has pictured him here. Next comes *Mesohippus*, a larger animal who had lost one of his toes in the course of ages. Still later in horse history is *Protohippus*, who had "learned" to stand on one toe, his other toes becoming very small. Last of all is the modern Horse (*Equus*), who has lost all but the faintest traces of his ancestors' additional toes. The drawings at the lower right show plainly the steps in the evolution of the horse's front foot (I, II, III, and IV). In the middle (V) the comparison is drawn between a horse's front leg and a man's arm. The same letter is used in each of the five drawings to designate the corresponding parts. Thus *e* indicates the man's wrist and also what we call the horse's knee. These two are really the same structural parts and we may say that the horse is in fact standing upon one "finger," the nail of which (*e*) has become a hoof.



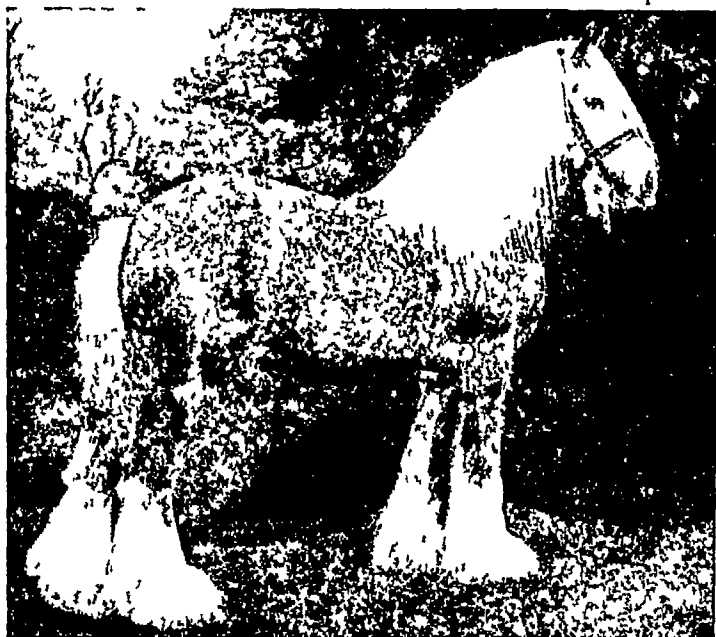
In very ancient times all four-footed animals were "plantigrade" that is, they walked upon the whole soles of their feet with their heels touching the ground as men and bears and elephants do today. In the course of time however there developed animals who "got up on their toes" in the manner of the horse illustrated here. Such "toe-walking" (digitigrade) animals, including creatures like deer, rabbits, mice, etc., and beasts of prey of the cat and dog tribes, became much swifter of foot and were better able to escape their enemies or overtake their prey. Thus they survived in the struggle for existence, while the "plantigrade" creatures, except those of great strength like the bear and the elephant, or of great intelligence like man, perished in the struggle for existence.

HORSE

tamed horses that escaped from the Spaniards in the 16th century

Horses range in size from the mighty cart horse, which may attain the great height of six feet at the withers, or highest point of the shoulder, to the Shetland pony, which sometimes is less than three feet in height. There are three main types of horse: the heavy draught horses, the tough, shaggy varieties, and the slender, more lightly-strung types, noted for their fleetness of foot.

Most of the ordinary horses of north-western Europe are descended from the ancient dun coloured Norse horse. The ancestors of our modern draught-horses were first bred as war



horses, because a very large and powerful animal was needed to carry the huge weight of a mail-clad knight. Varieties from France, Belgium, and Germany were long ago imported into Great Britain, where some of the most famous modern varieties originated, such as the Cleveland Bay, the Shire, the Suffolk Punch, and the Clydesdale. The Shire, which has been bred for centuries, is of immense weight—from 1,800 to 2,200 lb—with a plentiful covering of long hair extending round the front of the short stout legs. The magnificent Clydesdale, a Scottish breed named from the valley of the Clyde, not quite so large, is noted for its activity, strength, and endurance. The Suffolk Punch of East Anglia, generally of reddish-brown colour, is a splendid draught horse, as docile as he is full of fire and "go."

The Shetland pony is a diminutive creature, a product of the cold, barren Shetland Islands off the northern coast of Scotland. Its small size is doubtless due to generations of battling against adverse physical conditions in its native haunts. It possesses great strength for its size, will fatten on almost any kind of food, and is patient and gentle. It possesses a long, shaggy mane, and a bushy tail.

The Arabian steed is the ideal horse for speed. It is also noted for its graceful proportions, and its intelligence and docility. The Arab loves his horse as he does his



CONTRASTS IN HORSES

These three pictures give some idea of the very different breeds which, as the result of Man's breeding, have come from the one sort of original horse. At the top is an Arab steed, and in the centre a "Shire" draught horse, while at the bottom are a Shetland pony mare and her little foal (its height is only 14 inches), born in January, 1938, at the London Zoo.

Photos C. Chichester G. H. Parsons Planet News

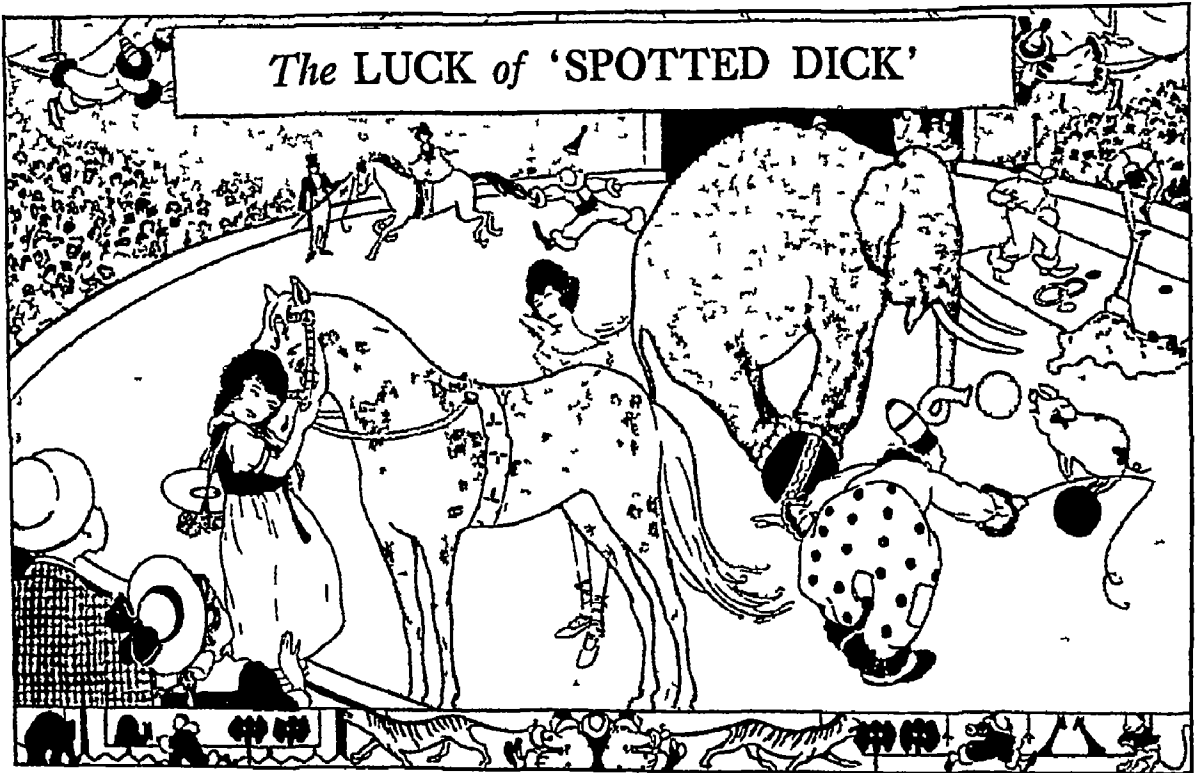
HORSE

child, and man and beast understand each other perfectly. The owner of a brood mare carefully selects for her as a mate a stallion of unblemished descent. The mare and colt live in the tent with the Arab and his children. Marvellous stories are told of the devotion to each other of the Beduin and his steed.

It has lately been shown that the original home of the Arabian horse was not the country after which it was named. The Arabs used no horses until after the Christian era. The Egyptians, however, as early as 1500 B.C., possessed horses which appear to have resembled the modern Arabian horses, while those that appeared in Babylonia, Palestine, and Greece about that time were coarse, thick set animals. Classical literature, moreover, proves that about 1000 B.C. North African steeds were highly

esteemed and eagerly sought after by the nations of the Mediterranean area. The Barb horse from Morocco is perhaps as famous as the Arab itself, and the Irish hunters almost equally noted in recent times, were originally derived from Spanish horses of Barb descent.

The thoroughbred race-horse is descended from the Arabian and the Barb and is carefully bred for speed. The marvellous improvement in this direction indicates what can be accomplished by proper selection in breeding and systematic training. When a race horse wins the Derby, or other great race, the foals that are descended from him may afterwards be sold at very high prices. In fact, you may find that father, son, grandson, great-grandson, and right down through several generations of horses, all are famous in racing history. (See also Riding)



"Suddenly, above all the fun a little girl's clear voice was heard 'Oh papa, Oh mamma I do believe that's our dear old Spotted Dick!' Ali Baba pricked up his ears and whirled around. Then he trotted over to a box and rubbed his nose against the cheek of the little girl who had loved him on the farm."

HERE is the story of a horse that was like the Ugly Duckling in the fairy tale. People laughed at him or pitied him for a long time, but by and by they saved up their sixpences and shillings, and paid to see him.

When his mother, a handsome chestnut, had this new baby, the farmer's family went out to the pasture to see him. The farmer's little daughter was so puzzled that she asked "Which is it, papa, a colt or a calf?"

For the baby was a piebald horse. He was creamy white all over, except where he was splashed with chestnut. And everybody knows that no proper horse is as spotted as a red and

white cow! The farmer thought it did not matter what such a horse was named, so he called him "Spotted Dick."

It was soon plain that Spotted Dick never could be of much use on the farm. He had such small hoofs and slender legs that he could not pull a plough or heavy loads, and he was so nervous that it really was not safe for women and children to drive him. So Spotted Dick was allowed to spend most of his time in the pasture. He and the little girl were great friends. She fed him with apples and sugar.

One day when Spotted Dick was four years old, a circus came to the nearest town. The

owners wanted hay to feed the horses, camels, and elephants. The farmer harnessed Spotted Dick with three other horses to haul a big load of hay to the circus.

The brass band, the shouting men, the flapping white tents, the red and gold wagons and cages, and the strange animals scared the poor piebald horse almost to death. He reared and strained and plunged and snorted.

Then suddenly he became quiet, and stood trembling. A little circus lady who rode horses and loved them had come out of her dressing tent to see what was the matter. She stood at his head and stroked his white velvet nose, and talked baby talk to him.

"Bless him, and was he scared? Zaidee wouldn't let old elephants and red wagons bite him. No, she wouldn't!"

She popped a lump of sugar into his mouth and petted him. She noticed his small head and arching neck, his little hoofs and slender legs. Many show people think a piebald horse brings good luck. In just five minutes the little lady bought the horse.

"His name is Spotted Dick," said the farmer with a grin. "What are you going to use him for—a clown?"

She shook her head. "Come to the show next year," she said, "and see him."

So poor despised Spotted Dick belonged to Mademoiselle Zaidee, the lady bareback rider. She named him Ali Baba, after the poor woodcutter in the "Arabian Nights," who found out the secret of the forty thieves.

That winter Ali Baba lived in a big training stable. He was fed and exercised and groomed, but he had lessons to learn. He was taught to march in procession with a brass band and all the animals and performers. He was taught to gallop round a sawdust ring and obey every order of the ringmaster's cracking whip. He got used to seeing elephants standing on their heads, and men and women swinging in trapezes overhead. He loved the funny clown. He learned to change his step and keep time to the music of the band.

Every day he spent hours with his dear mistress, learning all the pretty things she wanted him to do. He was plump now, and had a nice, broad, flat back. Mademoiselle Zaidee never put a saddle on him. She sat and stood and danced on his bare back, while he galloped round a ring with the easy motion of a rocking-chair. When Ali Baba did very well she gave him sugar.

In the spring the circus went on tour. By and by it came back to the town where Ali Baba's mistress had bought him. When the big three-ring tent was full of people, and the band began to play, the procession marched in and round the middle ring. At the head of all Ali Baba waltzed to the music with Mademoiselle Zaidee dancing on his broad back.

Ali Baba was just as spotted as ever, but among all the other queer circus animals he looked just right. Indeed, he was beautiful. His coat glistened like satin. His long tail and mane fell in white waves. His hoofs were polished and fitted with silver-plated shoes. He had a silver bit. His bridle was braided with white silk cords. His mistress was dressed in white satin and tulle and silver spangles. She had silver wings on her shoulders, and she danced like a fairy.

No wonder Ali Baba arched his slender neck with pride and flung out his dainty feet in time to the music. Then he and his mistress had the middle ring to themselves. The music went faster and faster. Round and round rocked Ali Baba. He jumped hurdles. His mistress leaped on and off his back. She made flying leaps through paper

hoops. When it was over she kissed her hands to clapping people.

Ali Baba bobbed his head, to show that he knew the clapping was partly for him. The clown pretended it was for him, and bowed and smiled. Then Ali Baba pushed the clown back, and the people shouted and stamped their feet in glee. A bouquet was thrown. He picked it up with his teeth and gave it to his dear mistress. Suddenly, above all the fun, a little girl's clear voice was heard, "Oh papa, Oh mamma, I do believe that's our dear old Spotted Dick!"

Ali Baba pricked up his ears and whirled round. Then he trotted over to a box and rubbed his nose against the cheek of the little girl who had loved him on the farm. The people clapped and cheered, and Mademoiselle Zaidee lifted the little girl to Ali Baba's back and the horse rocked round the ring with his old playmate, taking great care not to rock her off his back. The old friends had found each other again.

Horse Chestnut. Few scenes in an English landscape are more beautiful than an avenue of horse chestnuts in flower.

In London there is a well-known and popular occasion called "Chestnut Sunday," usually in early May, when Londoners in thousands make



'Round and round rocked Ali Baba, while his mistress leaped on and off his back.'

HORSE CHESTNUT

a pilgrimage to Bushey Park, near Hampton Court, to enjoy the beauty of the magnificent avenue of horse chestnuts in full flower

Although the "conkers," or seeds, of this beautiful tree, *Aesculus hippocastanum*, resemble edible chestnuts in appearance but not in taste, it must not be thought that the nuts are from sweet and bitter varieties of the same kind of tree. The chestnut and the horse chestnut trees are entirely different.

The horse chestnut is not a native British tree, but belongs to the mountainous regions of Greece, Persia, and Northern India, while closely related species occur in Northern America where they are called buck eye. It was introduced into England in the 16th century, and is now a very familiar tree, particularly in parks and gardens. The flowers are white, with pink and yellow markings. A species with red flowers is also popular.

These trees are very quick growers, and live for about 200 years, but their wood is soft and useless. In winter, the sticky, spearlike buds are very conspicuous and if you pick them they will open in water to lovely, brilliant green, lobed leaves. The game of "conkers," which boys play with the horse chestnut seeds, takes its name from "conqueror," the winner of the game.

Horse-Racing.

Football may be England's national winter sport and cricket her pre eminent summer game, but horse racing holds a place of its own in the hearts—and pockets—of the people. It is essentially a spectators' sport, for it is only the wealthy few who can afford to breed, train and race thoroughbred horses—the most valuable animals in existence.

The reign of Henry VIII is usually accepted as having seen the beginning of organized horse-racing in England. It is quite rightly called the "Sport of Kings," for the Royal Family have long displayed a genuine and practical interest in "the Turf." Edward VII was especially enthusiastic and successful, twice winning the Derby.

HORSE-RACING

There are five classic races "on the flat"—the Derby (qv) and the Oaks, run at Epsom, the St Leger, at Doncaster (named after its founder, Col St Leger), and the 2,000 Guineas and 1,000 Guineas, both at Newmarket, the headquarters of racing. These are all for three-year-old horses, the Oaks and the 1,000 Guineas being for fillies only. Another great race is for the Gold Cup at Ascot, where the fashion parade is as important as the racing.

All racing on the flat, which lasts from March to November, is governed by the Jockey Club, founded in 1750.

Racing Over the Sticks'

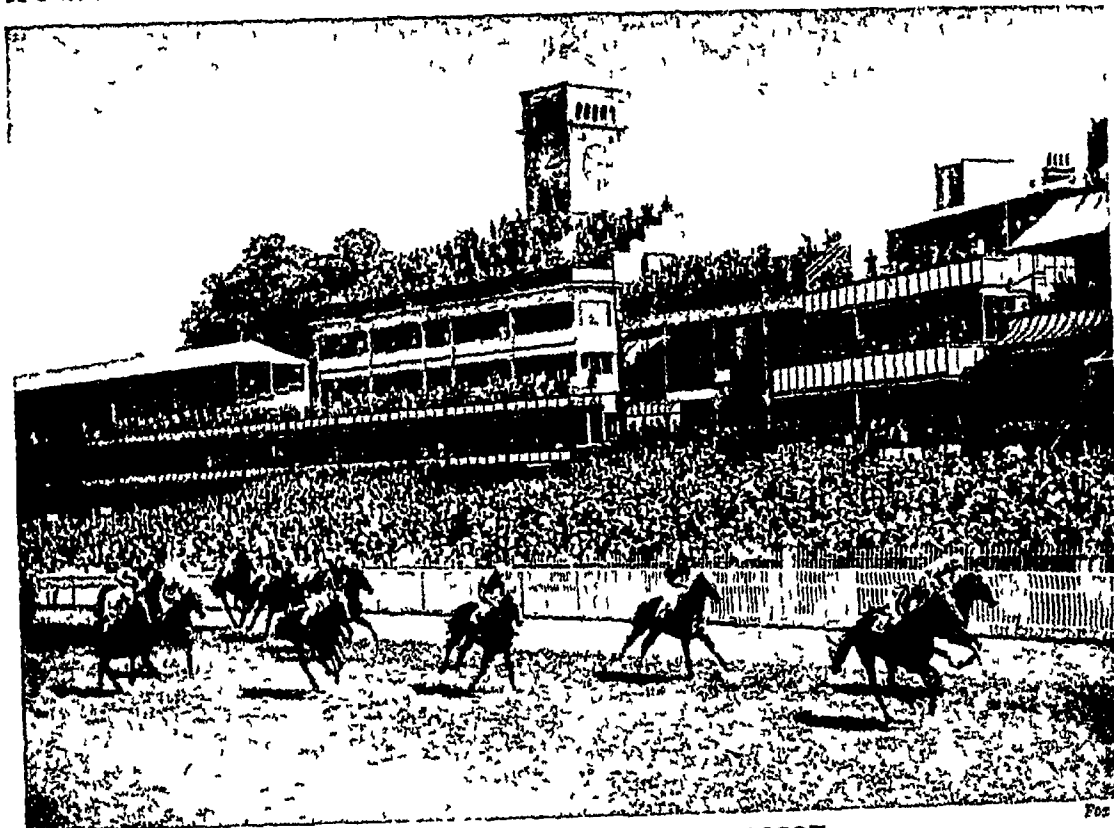
Steeplechasing, which may be either "point-to-point" over natural obstacles or over a prepared artificial course, is under the rules of the National Hunt Committee. The name is due to the fact that in early steeplechases a church tower was often the point aimed at. The great steeplechase of the year is the Grand National held over the Aintree course at Liver-



A FINE HORSE CHESTNUT IN FLOWER

The horse chestnut, largest of all our flowering trees, is not a native of Britain, though it is one of the most popular and well known sorts grown in the country. A comparison of this picture with that in page 955 will show how different it is from the sweet chestnut, of which it is no relation at all. When in flower, in early May, the horse chestnuts are a lovely sight.

F. J. Hosking



FINISH OF A RACE AT ROYAL ASCOT

Ascot racecourse is on the borders of Windsor Park, and was laid out by order of Queen Anne in 1711. The race meeting which is held there every June is one of the most fashionable fixtures under the auspices of the Jockey Club. The King and Queen are usually present, driving in state along the course to the Royal Box, seen on the extreme right of the picture above. The photograph shows the finish of the Ascot Stakes. In front of the Royal Box is the Royal Enclosure, to which only privileged spectators, with a pass from the Lord Chamberlain, are admitted.

pool in March—the most arduous test of all and the greatest spectacular racing event in the world.

Steeplechase riders are often amateurs, as opposed to the professional jockeys who ride most of the horses in flat races.

Hospitals. In the early days of Christian civilization in our own land, as well as throughout Europe generally, caring for the sick was rightly regarded as a religious duty. The erection of hospitals was therefore an honoured enterprise of the Church.

At first only the most helpless sufferers, such as lepers, were provided for, and the hospitals were always a branch of some monastery or priory, maintained by religious revenues, and staffed by devout members of some of the many religious orders.

St Bartholomew's Hospital in London, said to be the oldest general hospital in this country, is a good surviving example of a hospital dating from medieval times, with a history going back 800 years. It was founded as an annexe of the Priory of St Bartholomew in the same parish, and the priory church still stands close by on the opposite side of the road.

No doubt caring for the souls of the poor patients, rather than for their bodies, was the primary aim of those early hospitals. Ignorant

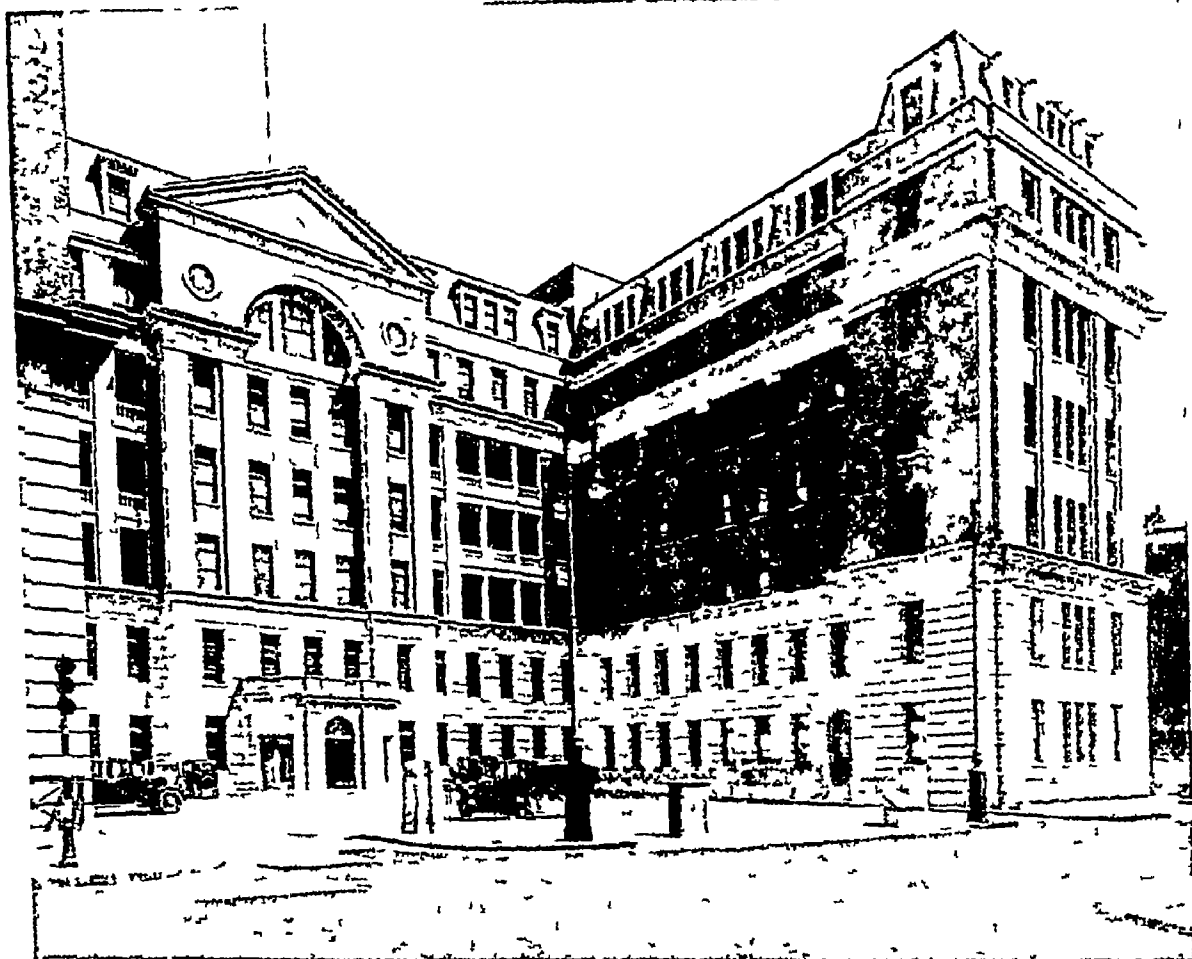
as people then were of surgery and medicine, and indeed of sanitation, it must have been hopeless to attempt to cure the ills of the poor sufferers whose condition was so desperate as to secure their admission to some one or other of the very few and primitive hospitals existing at that time.

Today, however, all this is changed for the better. Hospitals are now regarded as temples of healing, rather than as asylums for the dying.

Money cannot put into the most luxurious home the advanced medical facilities which the poorest can get in a good hospital. There the sick can have the expert care of the best physicians and surgeons, trained nurses in attendance night and day, all the discoveries and appliances of modern science, and skill to find out what the matter is and put it right, a trained dietitian to see that they have the proper food—in short, every comfort and care needed to give the best chance for recovery.

The principles of modern hospital organization had their rise, through the genius of Florence Nightingale (*q v*), out of the ghastly sufferings of the Crimean War, as did the profession of nursing, without which the modern hospital could not exist. A few years later the chemist Pasteur discovered the relation of germs to

SCENES IN FAMOUS LONDON HOMES OF HEALING



None of us really enjoys going to hospital, though every effort is made to ensure the happiness and comfort of patients there. An example of this is seen in the top left photograph of a corner of the children's ward in the Middlesex Hospital, London. The walls are brightly decorated, and toys are provided. On the right is a balcony at the Children's Hospital, Great Ormond Street, where convalescents may enjoy sunshine. The lower photo shows the new Middlesex Hospital building, opened in 1929.

Photos: top left: Topical; right: by courtesy of the Children's Hospital, Great Ormond Street; bottom: Sydney W. Newbery

putrefaction, and the great surgeon, Lister, applying Pasteur's discoveries to surgery, revolutionized operating room practice by the use of antiseptics. Almost every year since then has seen some advance, great or small, in medical science and hospital practice. Many hospitals have, in addition to free wards, provision for paying patients in private wards.

In the medical schools of the great hospitals the doctors of the future receive their training, and qualified nurses have a hospital training.

In addition to general hospitals, there are a number of hospitals devoted to special classes of disease, such as children's diseases, nervous and mental diseases, tuberculosis, cancer, etc.

Four Great Hospital Funds

Most of the hospitals in Great Britain are supported by voluntary contributions, and much of the money is collected by King Edward's Hospital Fund for London, founded to commemorate the Diamond Jubilee of Queen Victoria, the Hospital Saturday Fund, which organizes an annual collection on a Saturday at factories, workshops and in the streets, the Hospital Sunday Fund, which organizes collections at places of worship, and by "flag days." Patients are generally expected to make such payment for treatment as they can afford, but those who make regular contributions to the Hospital Saturday Fund or the Hospital Saving Association secure special privileges and reduced fees in hospitals and nursing homes.

Household Science. From the earliest days of civilization, Man's home has been one of his strongest interests. Long before there were cities or industries, or any of the multiple interests of modern life, Man was aware of the meaning of home—a cave at the end of the hunt, a primitive shack in the forest clearing. And for Woman, throughout the ages, home has been the centre of all her activities.

We might expect, then, that the science which deals with the home—called household or domestic science—would have been one of the earliest of all fields of knowledge to develop. But strangely enough, this has been one of the latest to gain recognition as a special science. Not until 50 or 60 years ago did this science, as an independent branch of learning, come into existence. Before that, knowledge about home-making had no laboratory save the home itself. Choice recipes were handed down in families. Mothers taught their daughters how to clean, to cook, to sew. The bride patterned her home after her mother's home and managed it as her mother had taught her.

But as home-making changed with the rapidly changing world, this plan became inadequate. Family traditions are of little help to the modern home-maker, who deals with a hundred new factors in housekeeping of which

her grandmother never heard—electrical and mechanical devices, new systems of buying, new foods, and new methods of preparing and selling them. Home-making now is far more interesting and far less enslaving, more complicated and yet easier than it ever was before.

The home-maker nowadays must know about colours and fabrics, pictures and bric-a-brac, furniture and carpets, together with such details as the attractive display of food and the arrangement of flowers. Since women do most of the buying of commodities, home-making has an important bearing on business and industry. In short, it is a field of almost unlimited scope.

But for effectiveness, domestic science has been organized to cover only certain related subjects, such as house-planning, food, clothing, home management, child care, and family relationships. *House-planning* involves all the many aspects of our living conditions. One who has studied it plans a house or chooses a flat wisely, with regard for situation, convenience of arrangement, proper lighting, plumbing, heating, and drainage. Living conditions have been found to affect vitally the character and the mental qualities of people, as well as their health. There should be adequate sunlight, adequate privacy, and a measure of tasteful beauty to enrich our lives. Experts have established standards for these things, and they are taught in household science courses.

Interior decoration is another aspect of the home. It has become in itself an elaborate study and an established vocation. The simpler phases of this study include the choice of furniture, draperies, floor coverings, lamps, linens, pictures, and other articles. They offer a guide to good taste for the person who is furnishing a home. More advanced interior decoration includes the study of textiles, of period furniture, art objects, tapestries, and the creative use of colours and materials.

Choice and Cooking of Food

The question of food has many angles in addition to mere cooking. Every year brings new evidence of the relation of health to diet. To plan meals which provide the necessary elements the housewife must know the chemical content of food. There has been a remarkable education of the public along this line in the past few years, and now almost everyone knows what calories are and that orange juice, for example, contains healthful vitamins.

In the household science school, the student learns the functions of all foodstuffs—how carbohydrates and fats furnish the heat and energy, how proteins build muscle and sinew, the regulating effect of water and roughage, the work of minerals in body building, and the part vitamins play in growth and the prevention of disease. She learns how to shop wisely to get

LITTLE HOUSEWIVES LEARN TO RUN A HOME



In the domestic science centres of the senior girls' schools run by the London County Council girls are given practical lessons in household management. A laundry class is seen busy at work in the lower photograph—washing, ironing and airing are all proceeding under the instructress's eye. In the upper pictures is seen a model flat, on the left the 'nurse' is preparing the 'baby' for its bath, while on the right the 'cook' is passing tea to the 'parlourmaid' through the service hatch between kitchen and dining-room.

Courtesy of the London County Council

these nutrients in the best and most economical form, how to prepare them to retain their beneficial qualities, how to preserve them, and how they are properly balanced in a nourishing diet. She also learns how to prepare foods with the least possible waste and how to "save steps" in cooking, how to set a table attractively and how to serve meals properly.

Learning about Cloth and Clothes

Clothing is another of the home's major interests, so this science and art of the home deals with its manifold problems. School courses usually begin with plain sewing and mending, and extend into every phase of the selection, manufacture, and care of clothing. Whether a woman has studied costume design, millinery, tailoring, and the like, and can make smart clothing herself, or whether she buys the family outfit ready made, she must be able to judge textiles, leathers, felts, furs, and other materials to get the best possible values. Household science teaches her the characteristics of various fibres and weaves, and tests for adulteration and "loading" in cloth, and it gives her a knowledge of manufacturing processes that enables her to detect poor products.

Every branch of household science involves home management in its broadest sense. In household science courses, however, home management is usually taught apart from the study of foods and clothing. It may include house-planning (choice of house or flat, furniture, etc.), in addition to the actual management of household affairs, which has to do with budgets, household accounts, time schedules, the buying of household supplies, cleaning and care of the house, child care, home nursing, etc.

The Care of the Child

All home-making centres around the well-being of the child. To make a science of child care, teaching it in schools, in public lectures, in books and magazine articles, was thought revolutionary not many years ago. Members of the older generation even scoffed at a scientific approach to a question as old as the world—that of rearing babies. But the approach was accepted, because there is no subject in the world on which mothers are so eager for knowledge and help. They soon realized that the dietitian, the hygienist, the playground expert, and, most recently of all, the psychologist, with his scientific understanding of child nature, could help them in this most important of all tasks. In the schools, girls even in the elementary grades are taught something of child care, for often they are called upon to care for a small brother or sister, and this work helps, too, to prepare them for the business of parenthood.

The teaching of home nursing is a valuable branch of household science, for modern health study has proved that some of the traditional

preventives do not keep disease away, as was once thought. If serious sickness does come to the family the advice of a physician should be asked, but certain danger signals should be recognized by the person who is responsible for family health. The doctor diagnoses the illness, gives prescriptions, and general orders, but the responsibility of carrying out instructions rests on the home nurse. There are important duties other than administering medicine. Taking temperature, pulse, and respiration, making the patient comfortable with bed devices, bathing, giving fresh air and sunshine, and limiting visitors are all duties in caring for the sick.

Diet is sometimes as important in the treatment of disease and its control as are medicine and surgery. Processes of elimination, digestion, and assimilation are very different in sickness from what they are under normal conditions. One must know whether the patient needs a liquid, soft, or light diet, the nature of such diets, and how to prepare them. The many simple remedies which are helpful should be kept in the home medicine chest, and the nurse should be familiar with necessary drug supplies, disinfectants, and other equipment.

The Teaching of Household Science

While home-making in itself is a profession, even if applied only to a small town flat, many people, particularly women, make of it a vocation of wider range. There is no field today in which finer opportunities are offered the girl with a natural aptitude for household science or any of its many branches. She may teach, of course, either sewing or cooking or any of the other included subjects. She may also lecture to groups of women or girls under various auspices. She may write on household science subjects, do editorial work for one of the many magazines and newspaper departments devoted to this field, or she may write "copy" for advertising the many things the housewife buys. Very many manufacturers of food products and trade associations of manufacturers of a certain type of product conduct research departments, demonstration schools, and services of many other kinds for home-makers.

Women's Talks by Wireless

Wireless has opened up still another field in this connexion, and women who prepare and give wireless talks of interest to women are usually required to have a background of household science training. Women with special knowledge of foods may serve a hospital or an hotel as dietitian, or manage a tea room, or restaurant. Many positions in department stores demand a training in domestic science, and the costume designer and the interior decorator must be grounded in its principles.

In many of the universities there is a department for the study of household science, where

a girl may take up the particular branch of the subject which appeals to her. In many of the large towns and cities there are also special schools, usually under the direction of the local education authority, which afford an excellent course of training in domestic subjects.

Hudson, HENRY (died 1611) We know nothing of Henry Hudson's life before his four voyages between 1607 and 1611. All of these were made for the purpose of discovering north-east or north-west passages to China, to reach the rich trade of the Orient. His first and second voyages were for the *Muscovy Company*, an English trading company. During the first, he explored the coasts of Greenland and Spitsbergen, where he realized the possibility of establishing a whale fishery. During the second, he reached Novaya Zemlya, trying in vain to force a passage through the ice-locked Kara Strait.

The third voyage, for which the ship *Half Moon* was built, was for the Dutch East India Company. In 1609, he sailed with a crew of only 20 men and explored the river which bears his name (and on which New York now stands) with the vain hope that it might lead to the Pacific Ocean. The last voyage was for an English company formed especially for the purpose. Again, in the *Discovery* he set sail in 1610, passed through the strait which bears his name, and explored and charted Hudson Bay. Winter overtook him, and he and his men endured terrible hardships from cold and lack of food.

Discontent and mutiny smouldered, and broke out in a flame in June, 1611. Hudson was overpowered and, together with his young son, the ship's carpenter, and several sick men, was cast adrift in a small boat. The boat was never heard of again, and we can only guess at its ultimate fate, and the tortured love of that intrepid father, as he saw his son sinking into that death which he too must face. The ring-leaders of the mutineers were killed by the natives. Others won their way back to England with Hudson's records.

Hudson's services though of little geographical value were of immense commercial importance, and they bore fruit in developing the rich



HENRY HUDSON CAST ADRIFT WITH HIS SON

Ill-fated Henry Hudson and his young son are seen here in the boat in which they, with certain other members of the crew, were cast adrift by the mutineers on the *Discovery*. The castaways were never heard of again, so the fate that they suffered must for ever remain a mystery.

From the painting by Hon. John Collier, Tate Gallery.

fisheries of Spitsbergen and the fur trade of the Hudson Bay region.

Hudson, WILLIAM HENRY (1841-1922)

It is by no means a rare thing for a writer to become well known only after his death, and among those of whom this may be said W. H. Hudson is an outstanding example. Hudson was born in August, 1841, near Buenos Aires, of British parents, and until he was 33 remained in South America. He spent those years mainly on the pampas or prairies of Argentina.

Hudson's special interest in South America, as, later, in England, was the study of bird-life in its natural surroundings. On this aspect of Nature Study he became an acknowledged authority, but his books at first reached only a small circle, and it was not until after his death in 1922 that he really became famous. From 1874 onwards he lived in England, mainly in London, where his wife kept a boarding-house,

HUDSON

but by 1901 the value of his work was being recognized, and in that year he received a civil list pension. His name was first made familiar by the establishment in Hyde Park of a bird sanctuary dedicated to him, containing the famous mural sculpture by Epstein, representing Rima, the elfin heroine of Hudson's "Green Mansions." His books are as full of scientifically correct detail as they are of unforgettable pen-pictures of Nature, both human and animal.



W H HUDSON

Hudson remained a poor man to the end of his life, and he became generally known only when Epstein's memorial to him (below) gave rise to controversy.

In Hudson's many books about birds, every fact of interest and many previously unknown facts about birds are chronicled in a style which is as far removed from the dry-as-dust scientific language as Hudson was from the biologist in a laboratory. He gained a wider audience, however, for his works on the countryside in general, wherein he not only gave vivid pictures of its natural beauties, but also evinced deep sympathy with and insight into the home life of country districts and rural customs and traditions. Such books include "Nature in Downland," "Hampshire Days," which contains a delightful account of the wild life of the New Forest, "Afoot in England," and "A Shepherd's Life." "Green Mansions" is a romance, set amid the tropical beauty of the upper Orinoco, and "Far Away and Long Ago," "Idle Days in Patagonia," and "History of My Early Life" describe his early years of apprenticeship to Nature Study.

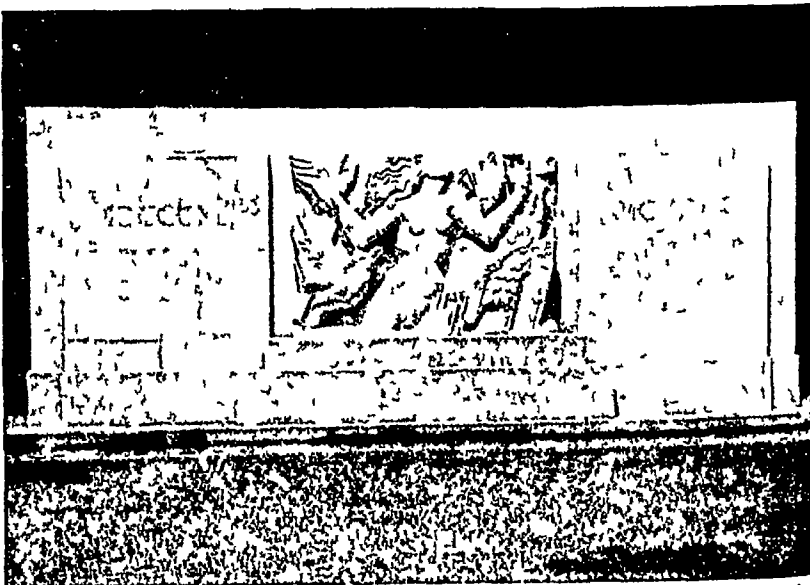
These books touch, and reveal, Nature at every point. Anyone who wants to get to know the wild life of our land could find no better tutor than Hudson.

Hudson Bay. Away up in north-eastern Canada, a huge blue patch on the map, lies the third largest land-locked sea in the world. This is Hudson Bay—a mighty gulf whose icy waters cover 500,000 square miles, reaching up north into the Arctic Ocean by means of the Fox Channel, and Fury and Hecla Strait, and into the Atlantic through Hudson Strait.

It is a lonely sea—this "Mediterranean of the North"—for, although never entirely frozen over, it is so obstructed by drift ice that only during summer can boats safely enter it.

In the short open season the Hudson's Bay Company's steamers find their way there to load up with thousands of pounds worth of furs. Then, too, the Indians living in scattered bands near the shore venture out after the vast shoals of seals, porpoises, walrus, and whales, and fish for the cod, salmon, and many other edible fishes, while here and there steam whalers worm their way through ice floes, and Eskimos' skin kayaks shoot out on the water for all the world like sea birds.

Save for a few trading stations and scattered settlements, the low shores—low except for certain high bluffs on the east and north-east—are the haunts chiefly of caribou and musk ox, of ducks and loons and ptarmigan. But it is believed that the whole region—whose soil and timber and minerals have as yet scarcely been drawn upon—will open up since the completion in 1931 of the new port of Churchill. This port and the Hudson Bay Railway, which together cost about £10,000,000, open a route from Canada's wheat area to the Atlantic seaboard 500 to 1,000 miles shorter than via Montreal.



EPSTEIN'S MEMORIAL TO W H HUDSON

Topical

This "Rima" panel by Jacob Epstein—suggested by the heroine of that name in Hudson's novel, "Green Mansions"—aroused considerable controversy after its unveiling, and frequently suffered from the foolishness of anti-Jewish agitators, who smeared it with tar and oil. Yet not only its skill in stone-cutting and design, but also its feeling and atmosphere make it a noteworthy piece of symbolic sculpture.

The Nelson, the Churchill, and the Severn are the most important of the 30 rivers which flow into Hudson Bay. The bay is about 70 fathoms deep, and it contains several islands. The entrance is so near the Magnetic Pole that the compass needle is unreliable. The Cabots entered Hudson Strait in 1498, and several Elizabethan mariners during the following



A TRADING POST ON THE SHORES OF HUDSON BAY

Hudson Bay is a gigantic inland sea on the north east coast of Canada, consisting of innumerable smaller bays and creeks. Wolstenholme is a settlement on the eastern coast of the bay, and in this picture we see some of its inhabitants unloading the cargo boat Nascopie, seen in the distance. Behind the cargo boat is a Government ice-breaker—a ship specially made for clearing passages for shipping through the frozen winter waters of this mighty land-locked sea.

Reproduced by permission of the Governor and Committee of the Hudson's Bay Company

century did likewise. The bay itself was not explored until Henry Hudson reached its southern limit in 1610.

The Hudson river has no connexion beyond its name with Hudson Bay. It rises in the Adirondack mountains in the U.S.A. and flows through New York State to the Atlantic. New York stands on its banks.

Hudson's Bay Company. The early history of north western Canada is the history of the Hudson's Bay Company and its rivals. Their trading posts were the first settlements in the western plains, around which many a thriving city has grown. The Hudson's Bay Company dates from 1670, when Prince Rupert set about realizing the visions of wealth inspired by the success of Pierre Radisson, a French Canadian who had, seven years before, brought to Quebec a cargo of 60,000 beaver skins, worth £100,000. With seventeen associates the prince obtained from his cousin, King Charles II of England, a charter giving them the sole rights of trade in the unoccupied lands which drain into Hudson Bay. It was many years before men realized the vast extent of this grant.

No one supposed it included a territory more than a few hundred miles in breadth, and years of exploration were necessary before it was discovered that 'Rupert's Land' included nearly

all of the present provinces of Manitoba and Saskatchewan, a large part of Alberta, and even certain territory now a part of the U.S.A.

The Hudson's Bay Company had something more than mere trading privileges, for it owned the land and governed the people also. This arrangement was intolerable to the settlers, and in 1869 the company was forced to surrender most of its privileges, though it was paid £300,000 and allowed to keep its forts and large tracts of land. It is today a wealthy trading corporation, with some 300 trading-posts.

Hugo, VICTOR MARIE (1802-1885) Born at Besançon in eastern France, the son of an officer of the French Army, Victor Hugo spent his childhood in Paris with his mother, in the splendid days of the first Napoleon, and in military camps in foreign countries. His mind and emotions were stimulated by public life, travel, and the atmosphere of glory which invested Napoleon's conquering armies, and the precocious boy wrote a tragic drama at fourteen. At seventeen he took the French Academy prize for a poem, and at twenty-two was recognized as a master of the lyric and ballad.

In the full flower of his fame at thirty, he headed a literary revolt from the classics, and founded the French romantic school of writers. Most of his followers are forgotten, but Hugo



VICTOR HUGO, SHAKESPEARE OF FRANCE

Author of some of the finest novels in the French language—who that has read them can forget “Les Misérables,” or “Notre Dame de Paris”?—Victor Hugo also won world-wide fame as a poet and playwright. This portrait shows him as he was in his later years, when he was recognized as the foremost man of letters of his generation.

From the painting by Léon Bonnat

had such original ideas, command of language, splendour of sentiment, persuasion, and sense of melody, that he is assured of literary immortality.

Hugo was tremendously in earnest as a patriot and social reformer, and a number of his poems, plays, and works of prose fiction are impassioned criticism of the laws and social customs of his time. As a political opponent to Napoleon III, whom he nicknamed “Napoleon the Little,” Hugo made himself so dangerous by his eloquence that he was banished from France. During twenty of his most productive years, while living in the Channel Islands, he enjoyed celebrity as “the Exile of Guernsey.”

There he wrote notable historical papers, rhapsodic memories inspired by personal sorrows, and novels. He was sixty years old when he wrote “Les Misérables” (The unfortunates), an epic work of fiction. This was in 1862. Three years later came “Les Travailleurs de la Mer” (Toilers of the Sea). Of his earlier novels the most

famous is “Notre Dame de Paris,” published in 1831.

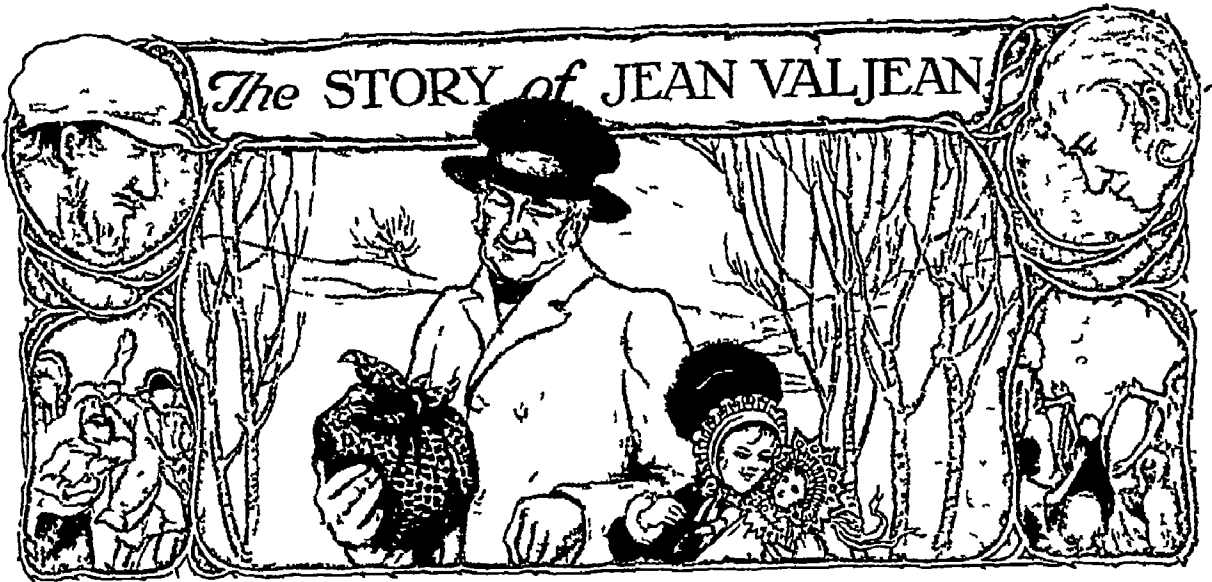
Intense in everything, always at the boiling point of fervour, Hugo was often merely violent over the passing event, but he was, in several instances, carried away by passion to the point of inspiration on themes of universal interest. “Les Misérables” is justly ranked with the greatest novels of all countries. “Hernani” (1830) is thought to be his best drama, and “Les Châtiments” (1833) is a collection of his finest lyrical poems. After the fall of the empire of Napoleon III in 1870, Hugo returned to Paris, where he became a popular idol.

His songs were set to music, his banned play “Le Roi s’amuse” (The King’s Diversion) was revived and he was the chief figure of the French Academy. When he died at the age of 83, the Pantheon—a church in Paris dedicated as the tomb of illustrious men—was opened for the first time for 75 years for his burial. His funeral was one of the most impressive ever seen in France.



HUGO’S HOME IN GUERNSEY

Although in his younger days Victor Hugo expressed boundless admiration for the first Napoleon, he had little but contempt for Napoleon III. Indeed, his criticisms were so outspoken that he had to leave France, and settled in Guernsey. Hauteville House, seen above, was his residence there for many years.



FOR breaking into a shop and stealing a loaf of bread to feed his sister's famished children, Jean Valjean was sentenced to the galleys for five years. Several times he attempted to escape and failed, this added to the length of his sentence, until at last when he was released he had served for 19 years. And now that he was free his convict's yellow passport was enough to close all doors against him. No inn would give him lodging for pay, and no home would receive him. At last he was directed to the house of the bishop.

"See here!" he said, when the door opened in response to his knock. "My name is Jean Valjean. I am a convict, I have been 19 years in the galleys. Since I reached this place I have gone from one inn to another. Everywhere they said 'Get out!' Nobody would have me."

"Fetch another plate," said the bishop, turning to his housekeeper.

That night, after supper, Jean Valjean for the first time for nearly 20 years slept in a bed. Jean Valjean had been a peaceful man, but the unjust cruelties he had suffered had made a criminal of him. And now he arose and took a basket of silverware and fled.

The Bishop's Candlesticks

Some hours later Jean Valjean was brought back to the bishop's house by three police guards. Again the good bishop saved him, for to him it was all a great mistake and the silverware was but a gift, and he reproached Jean Valjean for having left the candlesticks behind. The officers released Jean Valjean.

But the struggle between good and evil was not yet over for Jean Valjean. Once he robbed a little lad of a small coin. Why he had done it he could not tell, but when the boy had gone Jean Valjean suddenly realized with a feeling of horror what a wretch he was. The words of the bishop came back to him, and from that time forth he was a different man.

One day a stranger, who looked and spoke like a working-man, moved into the town of M—— sur——. In a few years he had not only made himself rich, but had built up the prosperity of the town. Father Madeleine, as the people called him, lived a quiet simple life, doing a multitude of good deeds as quietly as bad ones are usually done.

Back to the Galleys

One man alone did not share the feeling of veneration which the people had for Father Madeleine, but looked upon him with a suspicious eye. This man was an inspector of police named Javert. He believed that he had seen Father Madeleine before. He continued to watch the mayor as stealthily as a tiger, and at last his suspicions were confirmed, for Father Madeleine was indeed none other than Jean Valjean, the ex-convict. And now the clutches of the law again fastened themselves about Jean Valjean, and he was sent back to the galleys.

Some months later these lines appeared in a Toulon newspaper.

Yesterday a convict at work on board the *Orion*, on his return from rescuing a sailor, fell into the sea and was drowned. This man was registered by the number 9490, and his name was Jean Valjean.

Jean Valjean had indeed disappeared in the sea after his heroic rescue of the sailor, but it was not by accident. He had plunged into the sea in order to regain his freedom, for he now had a purpose which he felt he must carry out.

A poor woman named Fantine had been forced to leave her child with strangers in order to obtain work. When she first came to Jean Valjean's notice the poor mother had suffered all the misery that human strength could bear, and she died before her child could be brought to her. As she lay dying Jean Valjean solemnly determined that he would care for the little girl.

He found that the child Cosette, a frail little waif of eight years, had suffered much from curses and blows, cold and hunger. When Jean

Valjean placed in the child's arms her first doll and led her away to a new life, her trusting little heart went out to him, and she felt somehow as if she were near God. And her trust and love helped Jean Valjean to forget the bitterness bred by his early experiences.

Time passed. Still strong and brave in spite of his advancing years, Jean Valjean again and again faced danger and escaped it. But there remained for him one more great struggle. Cosette was now a young woman and Jean Valjean knew that he must give her up, for she loved a young man named Marius. Yet out of his great and unselfish love for Cosette, he risked his own life to save that of Marius. It was at the time of the revolution of 1830

Marius was wounded in the rioting, and Jean Valjean carried his almost lifeless form into safety by a dark and terrifying way that lay through the labyrinth of sewers under Paris.

When Marius recovered he and Cosette were happily wedded, and though the parting brought sadness to Jean Valjean, he was reunited with them in his last hours, and found joy in their happiness, a reward for his long sufferings.

"Come closer both of you," he said, when he lay dying. "I love you dearly. Oh! it is good to die so! To you, Cosette, I bequeath the candlesticks on the mantel. I do not know whether he who gave them to me is satisfied with me in heaven. I have done what I could."

—Retold from Victor Hugo's *"Les Misérables"*



BEGGING MERCY FOR THE HUGUENOTS

The massacre of the Huguenots on St. Bartholomew's Day, Aug. 24, 1572, horrified many Roman Catholics who knew of the plan and did their best to prevent it. Here one of those who were to take part in the massacre is being called by a priest to come out to the slaughter, while a nun begs him on her knees not to obey the command. This picture by Sir John Millais is entitled "Mercy St. Bartholomew's Day, 1572."

It hangs in the Tate Gallery, London.

Photo Mansell

Huguenots. (Pron hū'-ge-nōz) This name was given in the time of the Reformation to the French Protestants, who adopted the Calvinistic form of Christianity. They were to be found chiefly among the humbler classes in the industrial towns, while Paris remained strictly Roman Catholic. In their struggles for religious freedom, the Huguenots were driven to become a political party, and even a "state within the state."

By the middle of the 16th century their numbers and influence had aroused the fears of the Catholic party and the powerful family of Guise. Eight separate religious wars followed, the last of the series ending in 1598. The first war began with an attack by the Duke of Guise and his followers on a congregation of Huguenots assembled for worship in a barn. The peace which concluded the third war was broken by the massacre of St. Bartholomew, the most dreadful of the many crimes that marked this long and distressing era of religious and civil warfare. (See Coligny, Gaspard de)

The Huguenot wars ended in 1598, when their leader, Henry IV—who though formerly a Huguenot had now conformed to the

HUGUENOTS

Catholic Church—issued the Edict of Nantes, which gave the Protestants political rights, religious freedom, and the possession of certain fortified towns (See Henry IV, King of France)



THE HUGUENOT LOVERS

This famous painting by Sir John Millais, in the Tate Gallery, shows a Huguenot maiden attempting to tie on her lover's arm the badge of the Roman Catholic which would save him from the coming massacre of St. Bartholomew's Day

Photo Manneil

Their fortresses were lost with the capture of La Rochelle in 1628 (see Richelieu, Cardinal), during the reign of Louis XIII, Henry's successor. The all-powerful Cardinal Richelieu had at first shown a considerable measure of tolerance towards the Protestants, but when the Huguenots, under cover of religion, began to exert their political influence against the rapidly increasing power of the throne, friction between the Catholics and Protestants became inevitable. Although the Edict was in other respects confirmed, the Huguenots were still from time to time harassed and persecuted.

When Louis XIV revoked the Edict of Nantes in 1685, all protection of law was withdrawn from the Huguenots. Although they were forbidden to leave France, more than 250,000 of them managed to escape, and carried French arts and manufactures and some of the best qualities of French citizenship to England, Brandenburg, the Netherlands, and America.

HUMMING-BIRD

Hull. The full name of this city and seaport of Yorkshire is Kingston-upon-Hull, for it stands where the river Hull flows into the broad Humber estuary. Hull owes its importance, as Britain's third port, to its fine position 20 miles from the open sea, and within easy reach of the industrial areas of the North and Midlands. The docks cover over 200 acres, and handle a large trade with Germany and Scandinavia, as well as coastal traffic. Hull is, moreover, the premier fishing port in the United Kingdom. Local industries—apart from seed crushing and oil extraction, in which Hull leads the world—include shipbuilding, milling, cement making, aircraft manufacture, chemicals, and so on. Population (1936), 319,400.

Humming-bird. There are about 500 species of humming-birds, nine-tenths of which belong only to the Amazon and Orinoco valleys in South America—and they comprise the family *Trochilidae*. All have long slender bills—sometimes longer than head, neck, and body together—tiny bodies, and brilliant plumage.

Their extraordinary wing power is the result of the humming-bird's feeding habits. Its food is the tiny insects which loiter in the depths of flowers too small to support the weight even of so small a creature as the humming-bird. So it has developed very strong wings, which sustain it above the blossom, vibrating so rapidly that they make a humming sound, and the eye sees them only as a filmy haze.

To enable it to reach far into the deep flower-throats, it has developed its long beak and its



TINY HUMMING BIRD AT HOME

Ray Jones

The smallest of all birds, the humming-bird, is found only in the Tropics. Here is one of these minute creatures, sitting on its nest in a forked twig, compared with the finger of a man to help you to realize its size.

HUMMING-BIRD



long, tapering double-tubed tongue. This can be instantly extended to an extraordinary length, to seize insects in flowers or under the bark of trees. The common idea that the humming-bird lives exclusively on the nectar of flowers is a mistake. With the insects, of course, it gets some of the nectar, but it is the insects, not the nectar, that the bird is after.

Like the bee, the humming-bird is very useful in the cross-fertilization of plants, for specks of pollen cling to its body and are carried from flower to flower as the little bird searches for its food, and indeed there are some tropical blossoms specially adapted to cross-fertilization by these tiny creatures.

The nest of a humming-bird is a tiny cup-shaped affair, and it is made of plant down, the outside being covered with moss and strands of spider's web. The eggs are pure white and never more than two in number.

Among the humming-birds are the smallest known birds, only about 2 inches in length, but some members of the family are $8\frac{1}{2}$ inches long. The ruby-throat humming-bird of North America is about $3\frac{1}{4}$ inches long, and the upper feathers of the male are the glistening green of an emerald, with changeable amethyst lights over the wings and tail, the under feathers shade from pearl grey into the darker upper feathers, and the throat is like a glowing ruby, with all its variations of colour. The females are more soberly clad.

The racket-tailed humming-bird, found only in the valley of the Utcubamba river, South America, is one of the smallest and most remarkable members of the family. It has a curious tail, the second pair of feathers being

HUNDRED YEARS' WAR

wire-like, and crossing each other after forming a loop. The ends are formed into a racket-like expansion of a purple colour.

In the Andes lives the great humming-bird, the largest of all. Its coloration is dull, and its flight is one of its characteristic features, for when hovering over flowers it continually opens and shuts its tail feathers like a fan.

The double-crested humming-bird has amber-like feathers over each eye, and a tufted neck, with a wonderful red crest and long green-spotted tufts of red feathers extending from either shoulder. Its tail is wedge shaped. The bird, 4 inches long, lives in Brazil.



HUMMING BIRD TAKES A MEAL

Humming-birds are the world's smallest birds—tiny, delicate creatures with long, slender beaks. The top photograph is of Prevost's humming-bird, shown a little less than life size. The humming-bird in the lower photograph is feeding from a bottle shaped to represent a flower and containing mixed honey and milk food.

Hundred Years' War (1338-1453)

On the side of a hill near Crecy (qv), in northern France, an English army under King Edward III was drawn up in three orderly divisions, late one August day in 1346. On the plain below, outnumbering the English five to one, was a confused disorderly host of mounted French men-at arms and hired Genoese crossbowmen on foot, under the French king, Philip VI.

Suddenly the Genoese advanced to the attack. But they were tired with a long day's march, and their crossbow strings were loosened by the wetting received in a terrific thunderstorm. Although they "shot fiercely with their cross bows," they were no match for the more rapid shooting and far better marksmanship of the English longbowmen, whose shafts "fell so thick that it seemed snow."

HUNDRED YEARS' WAR

When the Genoese felt arrows falling they cast down their bows and fled, whereupon the French men-at arms dashed in and killed them as deserters

As darkness fell the remnants of the French army were fleeing in confusion, but the English lines remained firm in their position on the hill. Thus the English army won at Crécy the first great land battle in the long Hundred Years' War with France (*See also Crécy*)

The war had started in 1338, and it did not finally close until 1453. The causes of the conflict were to be found in the constant clashes growing out of the English hold on Guienne as a fief from the French crown, in the aid given by the French to the Scots in their wars against the English, and finally in the interference of Philip of France and his vassal, the Count of Flanders, with the profitable wool trade of England with the Flemish cities.

In addition there was the claim that Edward III himself was rightfully king of France, because his mother was a sister of the late French king, while Philip VI was only a cousin.

The conflict was really a series of wars, truces, and "peaces," lasting through the reigns of five

English kings, from Edward III to Henry V, and of five French kings, from Philip VI to Charles VII. At the time of the battle of Crécy the English had already won command of the English Channel by a spectacular naval victory at Sluys (1340), and after Crécy, the town of Calais, the door into France, surrendered to them on September 28, 1347.

For almost ten years after that the fighting lagged, partly owing to the "Black Death" (*q v*). Not until 1355 was the struggle between the countries renewed. At Poitiers (1356) the Black Prince with a small army of Englishmen was confronted by an overwhelming French force. The Black Prince arranged his troops on a little plateau protected at the flanks by a hedge and by rough and marshy ground. The brave but inefficient French King John threw away his advantage of superior numbers by ordering his knights, weighted down with their armour, to dismount and advance on foot against the hail of English arrows. "There was a sore fight that day," says the chronicler, "and many a great stroke given and received." One after another the three divisions of the French army were thrown into confusion. King John



QUEEN PHILIPPA INTERCEDES FOR THE BURGHERS OF CALAIS

Here we see the historic occasion after the siege of Calais when six of the chief citizens, with halters round their necks, presented the keys of the fallen town and their own lives as hostages to save the starved inhabitants from Edward III's vengeance. The king was determined to be avenged of the trouble that a year's siege had cost him, but when Queen Philippa, on her knees, besought him to liberate these six noble burghers, he finally yielded to her.

Painting by J. D. Penrose photo Mansell



IN ACTION AT POITIERS

The great battle of Poitiers, second of the English victories over the French in the Hundred Years' War, took place on September 19, 1356, and lasted a whole day—a long time in those days. Above from a contemporary MS, you see an illustration of the Black Prince's knights attacking the foe in the rear.

British Museum

and his youngest son, refusing to flee, were taken captive by the English and sent to England, where the king remained a prisoner until 1360.

The horrors of a peasants' revolt and civil strife were now added to the miseries of France. A treaty with England was concluded in 1360, but in 1369 the new king of France, Charles V, found an excuse for renewing the war. He organized an army of professional soldiers instead of the medieval knights, and by manœuvring brought one place after another into his hands. Only Calais in the north and Bordeaux in the south remained to the English at the time of Charles's death in 1380.

For nearly a generation the war then languished, due to factional strife for power in both England and France. Soon after the accession of Henry V, the hero king of England, it began again. At Agincourt (q v), near Crécy, a small English force was again confronted in 1415 by a large French army.

As in the two former great battles, the French forces consisted chiefly of dismounted knights weighted down with heavy armour. And again they were packed close together, in a narrow newly-ploughed field between two woods, in which they sank almost to their knees. Shakespeare makes Henry V say, the night before the battle, that he "wished not for a single man more" to share the glory of the impending fight. A third great English victory was the result.

By the Treaty of Troyes (1420) the defeated and disunited French agreed that Henry V should marry Princess Katherine, the daughter of Charles VI of France, that during the life of this insane king, Henry should act as regent, and after Charles's death Henry should reign as king of France as well as England.

Henry V did not live to wear the French crown, for he died seven weeks before Charles passed away (1422). The death of these two monarchs left the inheritance to both thrones to Henry VI, the nine-months-old son of Henry V and Queen Katherine.

The English claims in France, however, were disputed by the disinherited dauphin of France, later Charles VII, who refused to accept the Treaty of Troyes. At the end of seven years it seemed that Orleans, his last important stronghold, would surely fall to the English.

Victory by Joan of Arc

Just at this darkest moment in the fortunes of France, a new force appeared in the person of Saint Joan of Arc, the Maid of Orleans. (See article on Joan of Arc.) Inspired by her patriotism, the French forced the English to raise the siege of Orleans. Victory followed victory in rapid succession, until finally Joan led the dauphin through a hostile country to be crowned at Reims as King Charles VII. Even after Joan's capture her spirit inspired the French, and they fought to such effect that when the war ended in 1453, only Calais remained in English hands.



JOAN GIVES THANKS FOR VICTORY

After the relief of Orleans, Joan of Arc did not delay in thanking God for the victory he had given her. Bareheaded, she knelt in the great church, surrounded by her soldiers and the grateful townspeople.

HOW THEY CELEBRATE HARVEST-HOME IN HUNGARY



The harvest festival is celebrated in Hungary at the end of August with elaborate ceremonial. A delegation of farmers and peasants dressed in their festival clothes presents a crown of wheat to the lord of the manor. Sometimes it is drawn in a decorated ox-wagon by six oxen. This photograph shows the crown borne by picturesquely-garbed men of the Mezokovesd district.



Kankorsky

HUNGARIAN MAID AT THE WELL

This girl of the district of Lake Balaton is wearing her national costume as she does on every feast day , but in the tiny village near Kalocsa in which she lives, the day's supply of water has to be drawn from the well on feast days the same as on working days

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HUNGARY

PRAIRIE LAND of the DANUBE PLAIN

A country of proud peasants, wide pastures and magnificent scenery, Hungary is becoming an increasingly popular resort of tourists, who find delight in its ancient customs and buildings and the colourful costumes of its inhabitants

Hungary. (Pron hung-ga ri) Within half an hour of its capital city, Budapest, lies the heart of the present kingdom of Hungary—the great *Alföld* ("low land plain"), one of the richest agricultural lands of Europe, as level as a threshing-floor and of amazing fertility. Through its fertile expanse flow the broad, winding Danube and its sluggish tributary the Theiss, fringed with marshes. Great tracks that stretch uninterrupted as far as the eye can reach, give way to vaster fields in which peasants, in the garments that Asia wore



Kissing a lady's hand after the old Hungarian fashion

long before the Christian era, are feeding countless stacks of wheat to threshing-machines.

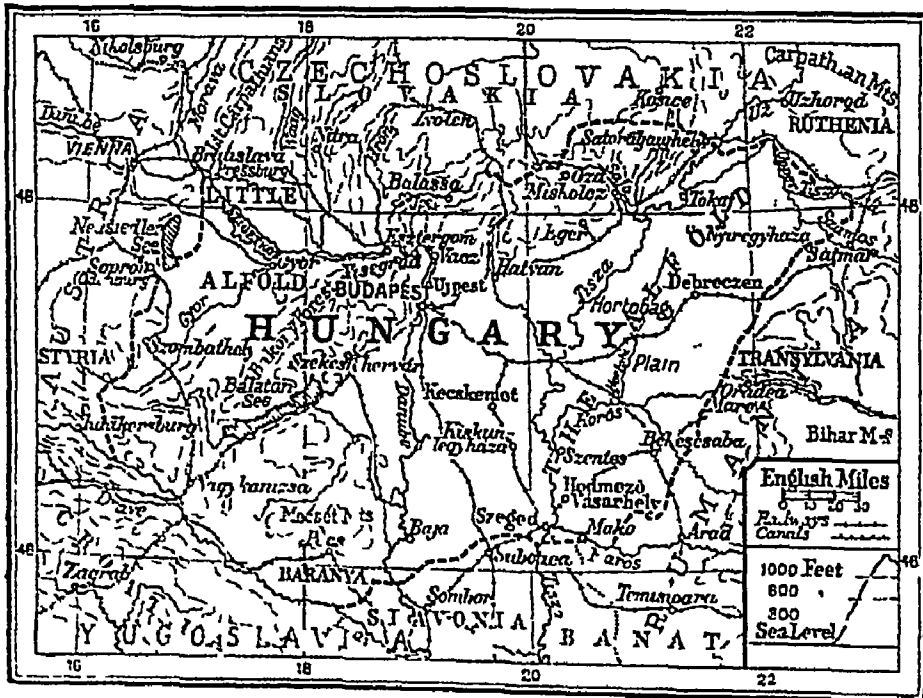
It is a peaceful land of broad meadows, strips of clover, huge windmills moving surely but leisurely, like the Magyar himself, of vineyards, long stretches of bright red peppers from which paprika is made, and purple fields of succulent lucerne, of huge rectangles planted with tobacco, cabbage, potatoes or sugar-beet. The landscape is everywhere dotted with splashes of red and blue—the full bulging skirts and kerchiefs of the peasant tillers of the plain. Stubble fields, gorgeous with poppies and sunflowers, contrast vividly with occasional patches of fallow land or pasture, where the bo, herdsman is tending a flock of snow-white geese.

Splendid roads, shaded by long rows of Lombardy poplars, lead off in every direction—past one village after another of

whitewashed walls, red tiled or straw-thatched roofs, church spires, and often the graceful stony finger of a mosque, to remind one of 150 years of Turkish rule over Hungary (1526–1683). The long narrow peasant houses look out on the street over little gardens of old-fashioned flowers, walled in with whitewashed sun-dried brick.

In his home, the "Magyar" (pron mod'-yör), as the true Hungarian calls himself, has reached a high stage of peasant culture. When he can afford a floor of wood, he has it, even in the kitchen, when he must put up with an earthen floor, it is compact, hard and wonderfully clean. In his kitchen, as clean and orderly as his front room, his wife cooks in a pot which hangs from a crane over an open fireplace, or on an earthen or tile stove with a tiled chimney. His passion for china and earthenware, dishes and bowls, and the pitchers and mugs with which he loves to line one or more of the walls of his house, is only exceeded by his love of flowers. He refuses to live without flowers and fruits and trees.

The Magyar's conception of a completely furnished house goes beyond mere furniture in sufficient quantity. His furniture must be decorated, his chairs and benches painted, his great chests carved. The walls are tinted, as are the great beams and boards of the ceiling. He even decorates his veranda, and always the gable ends of the house with tasteful designs.



HUNGARY AS IT WAS IN 1919

HUNGARY

His pig-pens, mangers, stables and barns are substantial, and often decorated in colours. The yard about the house is clean and orderly, either gravelled or covered with compact turf. His fields are not disfigured by fences or weeds.

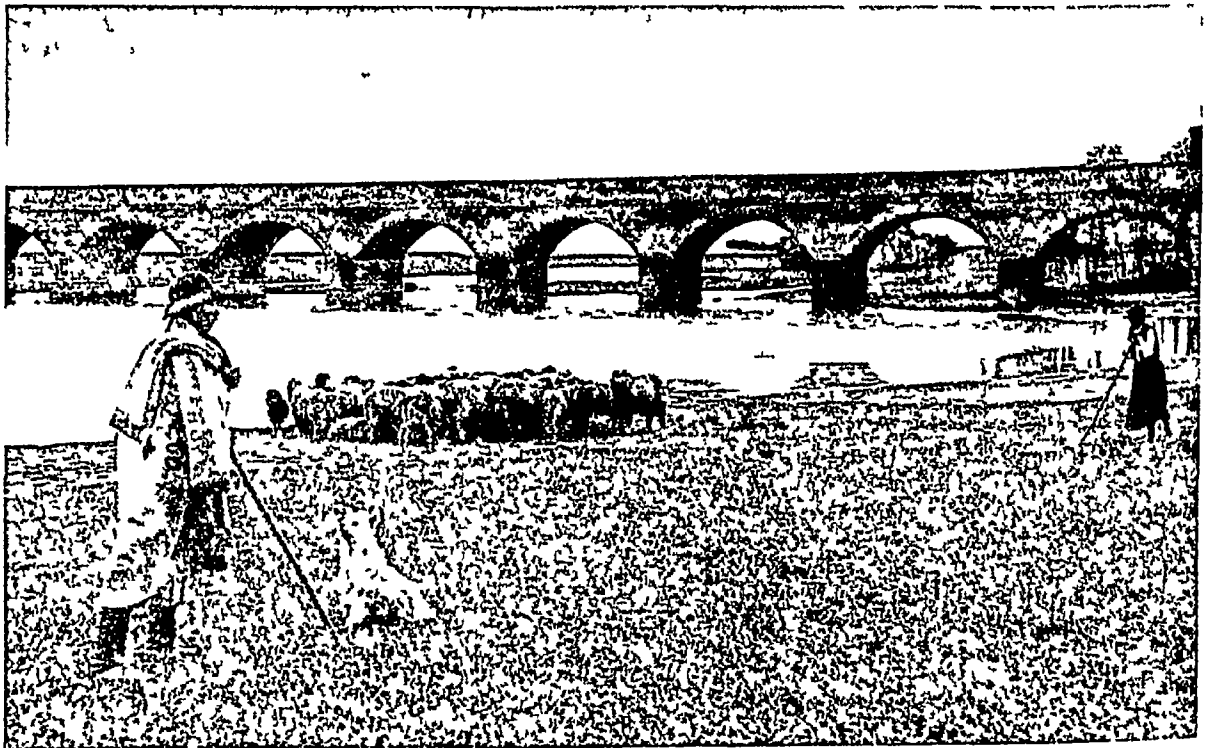
Vast estates belonging to the Church and nobility until recently occupied a large part of

the Alföld, 77 per cent of the peasants owned no land at all. With the change of government after the World War of 1914-18 most of the estates were broken up into small holdings.

Between the Alföld and the vineyard-clad foothills lies the *puzla*, or steppes of Hungary, which resembles the Alföld as it was before the

days of agriculture. Treeless, save for small clumps of locust trees near the far separated peasant homes, it is the range-land of thousands of big boned, long-horned Hungarian cattle and flocks of sheep, patiently tended by tall fellows in sheep-skin greatcoats and cowhide sandals, who lean on their crooks, while they puff lazily at their long pipes.

Here, too, are seen many camps of the Tzigany (pron tsé'-gah ni) or gipsies. About



PICTURESQUE PEASANT LIFE OF HUNGARY

Hungary is still a land where the peasants live the old simple life, and cling to their old customs. Like those in the top photograph they still wear the brightly coloured and elaborately embroidered costumes peculiar to their country, not merely to attract tourists, as do the peasants in some parts of Europe, but to satisfy their own love of pageantry. The lower picture is a pastoral scene in south-eastern Hungary. It shows a shepherd with his flock on the banks of the river Tisza, it will be noticed that he, too, wears a costume characteristic of the country, though designed for work and not pleasure.

Photos Hungarian Legation and Ewing Galloway

HUNGARY

their queer brown tents, naked dark-skinned children roll in the grass, and the men, with gaudy spangled waistcoats, flapping trousers and broad brimmed hats, stroll lazily about or idly pick the many-hued flowers, while the gaily bedecked women tend the fat wild turkey or young pig that hangs roasting over the fire.

The Magyar, a little shorter in stature than the average Englishman, is strong and healthy. His appreciation of the beautiful, so evident in his architecture, his innate orderliness and cleanliness, his passion for flowers and music—is second only to his love of his land and his absolute independence of spirit and self-confidence. He is generous to a fault and extravagant, but hard-working. He does not like trade, which has fallen almost entirely into the hands of the Jews.

The Magyar tongue is closely related to that of the Finns, Lapps, and Ostiaks of Asia, and bears little relation to the other languages of Europe except the Turkish. Although our alphabet is used, no word on a Magyar printed page gives us any hint as to its meaning, since the language has practically no Latin or Teutonic roots. This makes the very extensive literature written in the Hungarian language a sealed book to most Europeans.

Budapest, the seat of government, with a population of over a million, is beautifully situated on both sides of the Danube (see Budapest). Other

important cities are Szegedin, Debreczen, and Keeskemet. More than 5,000 miles of railways, most of them operated by the government, connect the leading cities with one another and with the outside world. The Danube is a great avenue of commerce. Hungary exports chiefly agricultural products—wheat (its main crop) and other grains, flour, livestock and meat, poultry and eggs, and sugar. It does a large trade in wheat and flour with Central Europe. The chief manufactures are iron and steel, machinery, cloth, flour, sugar, and alcohol. Its cotton mills have multiplied about five times since the World War. Its deposits of bauxite, the aluminum ore, are among the largest in the world. Hungary's

main imports are machinery, metals, coal, textiles, paper, and timber.

The Magyars, a Finno-Ugrian race, first came as nomadic raiders from Asia up the valley of the Danube as early as the 9th century. After their defeat by the Germans at the Lechfeld (in Bavaria) in 955, they settled down as permanent residents—an island of Asia in the heart of the Slavonic east of Europe—in the broad valley of the Theiss. In the year 1000 their king, known as St. Stephen, accepted Christianity and a crown from the Pope. In the 15th century John Hunyady, the great national hero of Hungary, defended the land as regent against the oncoming floods of Turkish conquest, until his death from plague a few days after his successful relief of Belgrade from Turkish siege (1456).

On the fatal field of Mohacs (August 29, 1526) the last of the Angevin line (which had ruled Hungary since 1308) perished and the horse-tail standards of Sultan Solymán the Magnificent were soon spread over almost the whole of the land. Over the small remnant of non-Turkish Hungary, the Hapsburg Ferdinand of Austria (brother of the Emperor Charles V) was chosen to rule. Not until 1713 did his successors complete the redemption of Hungary from Turkish rule.

Restiveness under the sway of the Austrian Hapsburgs led Hungary in the course of the ill-fated Revolution of 1848 to establish a short-lived

republic, with Louis Kossuth as president. When this was put down, Austria was obliged (1867) to grant Hungary equal partnership in what was thenceforth known as the "Dual Monarchy" of Austria-Hungary.

The new Hungary (native name *Magyarország*) with 35,911 square miles, was less than one third the area of the old Hapsburg kingdom. It extended from the river Drava on the south to the Danube on the north and from the neighbourhood of Bratislava on the west to the mountains enclosing Transylvania. The Treaty of Trianon (Versailles) after the World War gave the Slovak strip along the Carpathians to Czecho-Slovakia, gave Transylvania to Rumania,



HUNGARY'S GREATEST KING

Son of John Hunyady, Matthias Corvinus, seen above, was elected King of Hungary in 1458 and reigned until his death in 1490. A great conqueror, he was also a generous patron of the arts and letters.

From Frankel "Matthias Corvinus"



After serving with distinction in the Austrian Navy during the World War, Admiral Horthy became War Minister and Commander-in-Chief of the Hungarian Army. After the suppression of the Soviet revolution of 1918 he was elected Regent. He is seen on the left, in December 1936, talking to Herr von Papen, German ambassador to Austria.

and handed the Slavonia - Slovene - Croatian territory on the south and south-west to Yugoslavia. All this deprived Hungary of some 10,000,000 of her population, about one-third of them pure Magyars. In October 1938, a strip of Czech territory (4,630 sq miles) was awarded to Hungary, with its 1,029,000 inhabitants, including the towns of Kosice and Uzhorod. In November 1939, Hungary took possession of the former Czech province of Carpatho-Ukraine (Ruthenia).

After the War, Hungary was a republic from November 1918 until March 1919, when a Soviet government, headed by the adventurer Bela Kun, took command for a few months. Opposition governments were set up, however, and with Rumania's help, Bela Kun was driven to exile, the Soviet overthrown, and a national government established, with the old monarchical constitution in force. Hungary was forbidden to restore a Hapsburg to the throne without the consent of the Allied Powers, and Admiral Horthy, as regent, took over the duties of the king. The national parliament consists of two Houses. Women's suffrage was introduced in 1929. Nearly 90 per cent of the population of about 9,717,000 are Magyars.

Huns. A writer of the early Middle Ages gives us a picture of this savage wandering race. "Nations whom they could never have defeated in fair fight," he says, "fled in horror from those frightful faces, if indeed I may call them faces, for they were nothing but shapeless black pieces of flesh, with little points instead of eyes. They have no hair on their cheeks or chins. Instead, the skin of their faces show deep furrowed scars,

for hot irons are applied to the face of every boy that is born among them, so that blood is drawn from his cheeks before he is allowed to taste his mother's milk. The men are little in size, but quick and active in their motions, and they are especially skilled in riding. They live largely on half-raw animal flesh, which they merely warm by placing it between their thighs and the backs of their horses. On horseback every man of that nation lives day and night. On horseback he takes his meat and drink, and when night comes he leans forward on the neck of his horse and there falls asleep."

This lively account by a hostile writer cannot be accepted as historical fact, but all accounts



THE HUNS ADVANCE INTO GAUL

One of the decisive battles of the world was the defeat of Attila, leader of the Huns, when he had advanced into Gaul, the Roman France, as far as Orleans. He was forced to retreat by the combined forces of Aetius, the Roman leader, and Theodoric, king of the Visigoths. This picture shows Attila advancing into Gaul before his defeat.

go to prove that the Huns lived up to the bad reputation he gave them

In A.D. 374 the Huns entered Europe for the first time from their homes in Central Asia, and occupied the region north and west of the Black Sea. There they lived for more than seventy years, before they began their second and greater wave of invasion. In 451, under Attila (*q v*), the "Scourge of God," they swept into Germany and crossed the Rhine into what is now France.

Defeated there, the Huns descended into Italy, devastating the country. They would probably

have taken Rome, as Alaric had done 40 years before, had it not been for the bravery of Pope Leo I, who in an interview so overawed Attila that he spared the city and withdrew from all Italy. With the death of Attila in 453 the empire of the Huns, which included all the peoples from the Volga to the river Rhine, quickly fell to pieces. Their great leader lived on in German legend as Etzel in the "Nibelungenlied."

The Magyars, who several centuries later settled in what is now Hungary, were related to the Huns.

The WORLD-WIDE SPORT of the CHASE

In all quarters of the globe, and from the earliest times, Man has indulged in this most thrilling of all sports—at first for food and later for pleasure alone. This article describes most varieties of hunting.

Hunting. One of the first occupations of Man, as he emerged from among the wild beasts, must have been hunting of some sort, and since the first, brutish, stone age hunters stalked and slew their game. Man has hunted, in all parts of the world, animals of every type, great and small. Moreover, it cannot have been so very long before hunting for sport came into being. When the needs of the family had been satisfied, there must have been private rivalries to settle as to who had the most skill, or perhaps there were larger, finer beasts which had escaped and which must therefore be further pursued. In the monuments and writings of all the earliest peoples, hunting is a subject of frequent mention, and more than one of the greatest early races were hunters—the Assyrians, for example.

Excepting where there is still an abundance of wild life and comparatively little other food, hunting has long ceased to be of importance to Man's economy, and it flourishes now chiefly as a sport. In England, it might almost be said that it flourishes as an institution, and it is a remarkable fact that, were hunting of such creatures as the fox and red deer to cease they would in all probability become rapidly extinct, because they are "preserved" to afford sport

Whatever your views on the desirability of carrying on such a sport as fox-hunting, there can be no doubt of the picturesqueness of the scenes which it occasions. The colour of the huntsmen's coats—"pink," as it is called, although it is more scarlet, really—the black-and-tan and white of the hounds, the crisp air and clean landscape, combine to make the meet of a foxhunt one of the brightest and most characteristic of all sights in our English countryside. So that you will hardly be surprised to find the great part which hunting has played, for instance, in modern art, and the number of great painters and engravers which it has inspired, drawn as much by their love of the

sport itself as by its artistic possibilities.

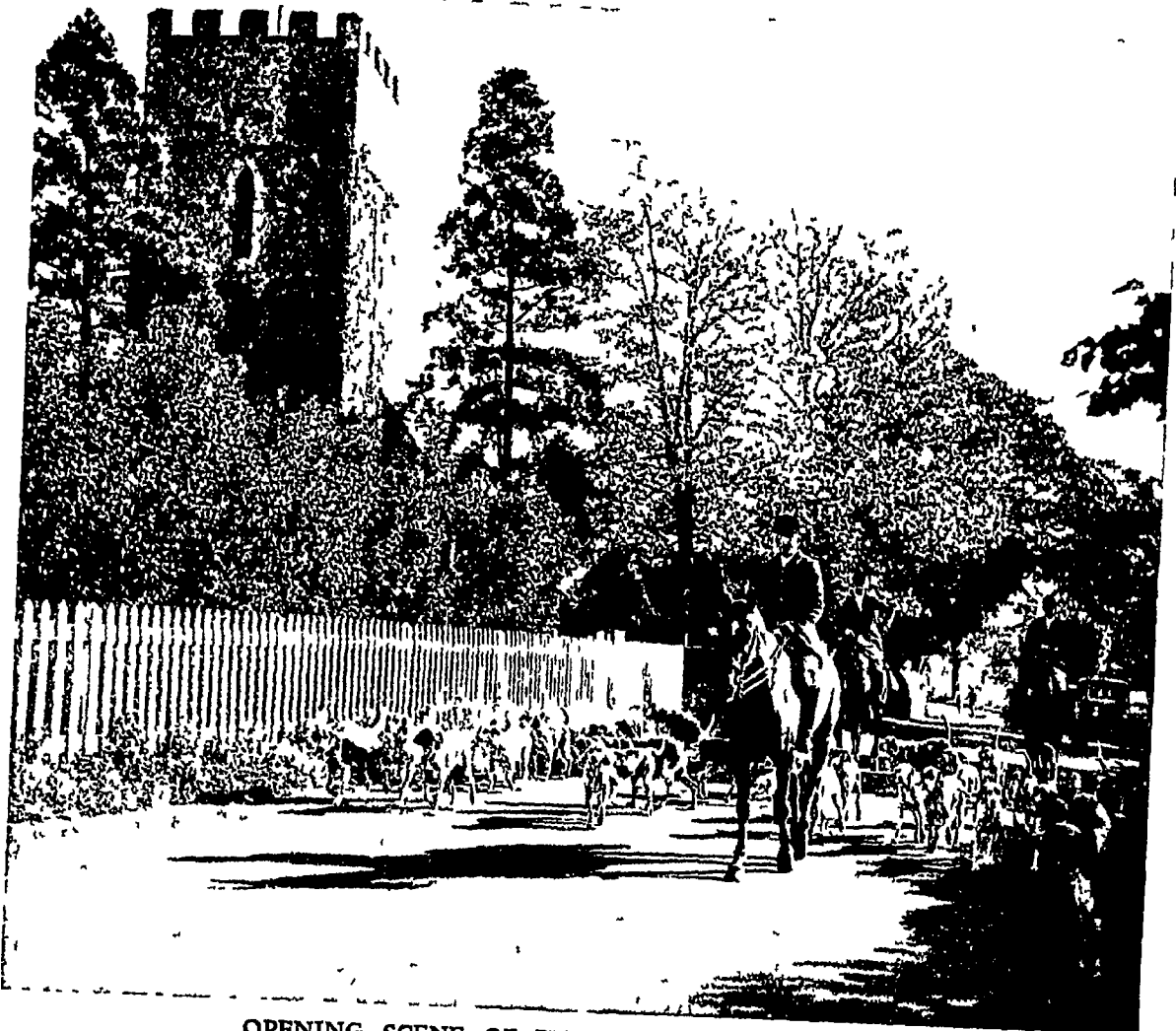
It is only since about 1756 that fox-hunting has been popular as an organized sport. The hunting season starts with cub hunting—that is, hunting of the young foxes with the new, more or less untried hounds—in September, and it is not until November that the real hunting begins. The hunt starts with the meet, held perhaps at the home of some important member, who may entertain the "field" to a "hunt breakfast." At other times, the meet is held at some spot in the country which is to be hunted that



THE HOUNDS ARRIVE

A feature of modern fox hunting is that packs of hounds are taken far greater distances than previously in a specially-built van. These hounds are just being released from the trailer in which they have been transported to the meet.

HUNTING



OPENING SCENE OF THE FOX-HUNTING SEASON

For Photos

"Cubbing," as the hunting of fox cubs is called, marks the opening of the fox-hunting season, and here are the hounds arriving at a meet in Kent. The long shadows betoken early morning, and indeed to be at a cubbing meet you must be up at an early hour. Young hounds and younger members of the hunt take part in these meets, and, as their quarry is the young fox, all three are, so to speak, trainees for the more arduous work to come in the winter months.

particular day—for each pack of hounds has its country divided into different sections, and one of these is generally hunted on one particular day in the week. A cross roads, an inn or some well-known wood by the roadside may provide the place for the meet. There are traditional places in most hunts, for such occasions as Boxing-day, or the morning after the Hunt Ball.

Meets for cub-hunting are held early in the morning, and are largely confined to the "coverts," as woodlands are called in hunting terminology. But the ordinary hunt too, starts at a covert, for it is there that a fox will most likely be found. The huntsman will let the hounds work about until they find a fox, when they set off in "full cry," probably across country. If all the hounds are there, all is well, if not, it is the business of one of the second "whippers-in" to bring up the rest of the pack. The "whips," as they are called for short, must obey the huntsman implicitly, knowing from the note of his horn just what he is doing, or intends to do, with the hounds, and

what he wants them to do. The huntsman and the master alone may ride close behind the hounds, the rest of the "field" following them. The first whipper-in must be able, when occasion occurs, to prevent the hounds from following any fox other than their original one, to see that all the hounds are present, and to guide the hounds at points where the huntsman himself must be in a more commanding position, as for example, when running into cover. Usually he rides in front, and the second whip behind the huntsman. When the hounds are running straight across country on a scent so strong that they can follow easily without a check of any sort, they often run silently, but when they first pick up such a scent they all give tongue together. And no one, however he may disapprove of hunting, can be quite unmoved by the "music" of the pack in "full cry." As the fox is "viewed," the cry of "Tally-ho!" is given, another welcome sound, which as often as not is unheard until the fox is almost beaten and the hounds are right on

HUNTING

its tail. At the end of the hunt, the "mask" (head), "brush" (tail) and "pads" (feet) of the fox are given to favoured members of the field, usually those who are "in at the death," and after their removal the fox is thrown to the hounds. Often, of course, the hounds may not kill at all in a whole day, at other times they may account for several foxes in a few hours.

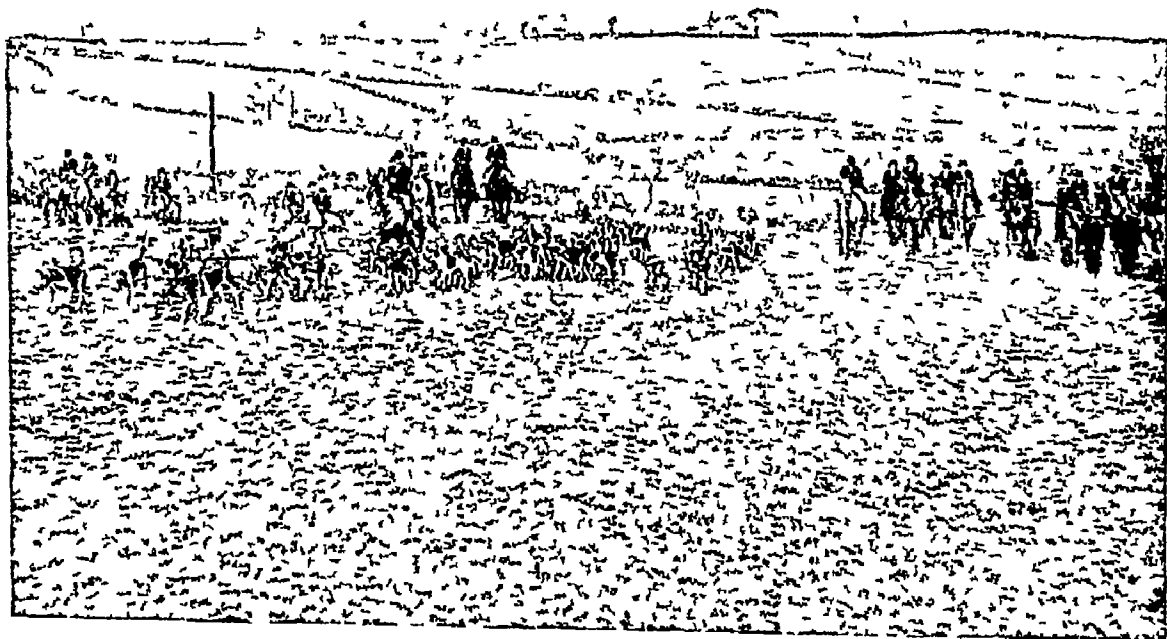
The modern foxhound, of course, is very highly bred. When the puppies are growing up, they are boarded out with farmers and others, who "walk" them until they are old enough to join the pack, and prizes are given at the end of the "walking" period for the finest of the young hounds. These hounds are for the most part sleek, smooth-coated, black-and-tan and white creatures, but in a few packs, such as the Seavington, in Somerset, the true old English, shaggy, long-haired foxhound is still used. In the north of England, and in Wales, foxes are hunted on foot in the mountains.

Besides the fox, the red deer, hare and otter are all still actively hunted in Britain. The modern staghound is a very similar animal to a foxhound in most ways, only rather larger and often with more white about it. In a staghound pack, the hounds are divided into two sections, one of which, known as the "tufters," selects and rounds up the chosen stag, driving

it towards the others, which then give chase, and as often as not this hunt ends with escape for the quarry. When the stag is hopelessly cornered, it may be put to death with a humane killer, while in the case of most stag-hunts, where the stag is a "carted" animal liberated for the hunt, the last thing the master wants to do is to kill it.

Beagles, as the hounds used for hunting hares are called—for harriers, originally used for hares, have been bred up to hunt the fox now—are similar in colour to foxhounds, but smaller, shorter in the leg. And basset hounds, also used for the hare, are smaller still—curious little, low-built, short-legged dogs. The hare is hunted on foot, giving fine sport and exercise.

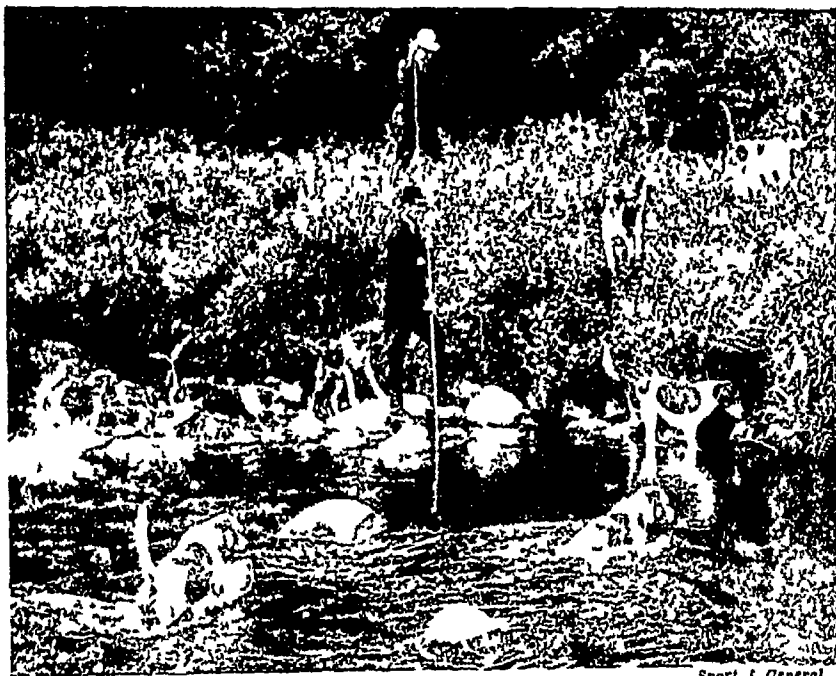
Otter-hounds are of various types, bred mostly from fox- or stag-hounds, but the finest—the rarer, true otter-hounds—are big, rough-coated, heavily-built dogs that have been bred up especially for this hardy quarry, and that, like it, are as much at home in the water as on land. Otter-hunting requires great skill on the part of the huntsman, and as a sport gives the followers far more of a day in the open than most others, for this reason it is followed by those who love the countryside and its out-of-the-way places as much as the hunt itself. Finally we must mention the drag-hunt, where



A PACK OF FOXHOUNDS MOVING TO A COVERT

Fox Photos

This photograph shows a premier pack of foxhounds the Quorn, moving off after a meet to draw a covert. The country which the Quorn hunts is round Melton Mowbray in Leicestershire, about 20 miles square in area and is an ideal stretch of hunting country, consisting, as the photograph shows of wide, spreading grass fields, with no hills of any eminence. The Quorn country, which derives its name from the village of Quorndon in Leicestershire, has been hunted since the 17th century.



OTTER-HUNTING, A POPULAR SUMMER SPORT

This is the only type of hunting that is engaged in to the full in the summer months and it is still popular in many parts of England, especially in the west from Cornwall to Scotland. The hounds you see here are not true otter-hounds, but are more of fox-hound type, that in the right foreground, in the water, most closely resembles a true otter-hound. Notice the long poles used by the huntsmen, valuable in maintaining a foothold on the slippery bottom of the stream. This is the Dartmoor pack.

the hounds follow an artificial scent, purely to give the "field" the sport of riding after them. This sport gives exercise and riding to many people living in country which for one reason or another cannot be hunted in the ordinary way, and, of course, no one can complain of cruelty to an artificial quarry.

Hunting, as practised by the English, has been transported by them to many other parts of the world, and there are fox-hounds, modelled on those of the "Shires," in Spain, France, the United States, and elsewhere. But in general each type of country has its own hunting. On the Continent, the wild boar gives great sport, and in India, boar-hunting, under the name of pig-sticking, is an art of its own. Elsewhere, natives with their own dogs will hunt the local fauna, and in some countries big-game hunting, which consists often more of shooting than of much active hunting, is almost an industry. It is especially carried on in

Central and South Africa, India, Canada, and parts of Russia.

In conclusion, it should be mentioned that there is growing opposition in Britain to the hunting of wild animals—particularly deer—as a form of sport, because of the cruelty it involves and of its barbarous accompaniments, e.g., "bleeding" the young members of the hunt. In the forefront of the agitation is the League for the Prohibition of Cruel Sports (whose address is 7, Victoria Street, London, S W 1).

Huntingdonshire.

This inland county is amongst the smallest in England, and has Bedfordshire on the south, Cambridgeshire on the east, Lincolnshire on the north, and Northamptonshire on the west. It is within the

low-lying district of the Fens, and has therefore much fine farming land and rich meadows. The principal river is the Ouse, on which the county town, Huntingdon (population, about 4,100) stands. Huntingdon was at one time



PIG STICKING VICTOR AND VICTIM

Pig-sticking is one of the most exciting forms of sport, but also one of the most dangerous, for a wounded pig can upset a horse with its charge, and may fatally wound its rider with its sharp and fearful tusks. Here a winner of a contest in the Kadir cup, the chief pig-sticking trophy, examines the pig he has killed, even his horse shows a good deal of interest, as well it might after the part it has played in bearing its rider to victory.

in its history a much more important place. It began to decay after the Black Death in the 13th century. In All Saints' church, Huntingdon, Oliver Cromwell was baptized. On the opposite bank of the Ouse is situated the old town of Godmanchester. St Neots, another busy market town on the Ouse, is situated in the southern boundary of the county. The church of St Mary in this town is one of the finest in Huntingdonshire. St Ives is distinguished by having been the home of Cromwell when he was a farmer, and in the town there is a fine statue of him with the inscription "Oliver Cromwell, a Citizen of St Ives". Stilton, on the Great North Road, has given its name to a famous brand of cheese. The population of "Hunts" is about 56 000.

Hurling. If you live in Ireland, you will know all about this sport, for it is the national game of the "Emerald Isle", and even if you are only a visitor, you will see it played almost everywhere. If you watch a game the first thing you will notice is the stick used, the "hurley," which is like a broadened, shortened hockey stick, and you will see the goal-posts sticking up—tall posts like those used for Rugby football. Hurling is similar to hockey, but it is by no means a new sport, it goes back, in fact, into the legendary times of the old Gaelic heroes, and in any case was played before the

Romans arrived in Britain. In those days it was a royal game, in which the king himself might well take part, and it is said that in important matches the losers often lost their lives as well as the game.

As played now, "hurley," its popular name, takes place on a field some 150 yards long, and over 80 yards in width. There are fifteen players on each side, this number being a reduction from the seventeen which was more usual at one time. These players are a goal-keeper, three backs, three half backs, two "mid field" men, and usually two lines of forwards. The ball is a largish one, of cork and yarn,

covered with leather, and the aim is to drive it between the goals, as in hockey. But if it goes over the cross bar, but still between the posts, a point is scored. A goal counts three points.

The country is divided into several areas, each of which contains several counties, and these compete for the national championship, known as the All-Ireland Final. Besides this, there are organized championships within every one of the individual counties. Hurley is played with the greatest enthusiasm all over Ireland.

Another game of the same name survives in Cornwall, where it is also the "national" county game. In this type of "hurley" a small, silver-coated ball is used, which must be borne by a member of one side (their number is unlimited) back to his own goal—usually



EXCITEMENT IN A 'HURLING' CHAMPIONSHIP

These men are playing "hurley," as the Irish national game is usually called, in a match between Kilkenny and Galway. Notice the short, thickened sticks, like abbreviated hockey-sticks used in this game and themselves called hurleys. The dress as you see, is much the same as that for other winter ball games. Though their play is usually rougher and their sticks are often home-made the village lads all over the Emerald Isle enjoy a game like this every Sunday afternoon, as well as in their spare time.

some landmark or conspicuous object, the members of the other side trying to prevent him. The bearer of the ball must carry it for all to see and runs with it until caught, when he must throw it towards his own goal. But apart from this there are few rules, and the game becomes almost a real hunt, with an ever-changing human quarry. It is now played only on certain special occasions.

Huss, JOHN (about 1369-1415) "I am prepared to die in the truth of the Gospel which I taught and wrote." Like Wycliffe of England a generation before, and like Martin Luther of Germany who was to lead the great Protestant



JOHN HUSS BEFORE THE COUNCIL OF CONSTANCE

The great religious reformer, John Huss, had as stormy a career as many a famous soldier, meeting his death for proclaiming and refusing to abandon his semi-Protestant principles. No scruple was allowed to stand in the way of his enemies, for, in spite of a promise of safety by the Emperor if he would attend the Council of Constance, he was arrested immediately he arrived there. Summoned before the Council to recant, he refused and was condemned to a heretic's death.

Painting by O. P. Lessing, Frankfurt Gallery, photo Bruckmann.

Reformation a century later, John Huss, the Bohemian religious reformer, defied the authority of the Church and was ready to defend his principles to the uttermost. In his case the uttermost was demanded, and for his views he was burned at the stake as a heretic.

Huss was born of humble parents in the little Bohemian village of Husinec. He was christened Jan, or John, and from his birthplace was called John of Husinec, or, in shortened form, John Huss. Having decided to become a priest, he entered the University of Prague, and after his graduation became a lecturer there on philosophy. He also took a prominent part in the nationalist Bohemian protest against the undue influence of Germans in the University, which in 1409 led the German masters and scholars to found the rival University of Leipzig.

As a preacher Huss won the hearts of the people by his powerful sermons in the Czech (Bohemian) tongue, as well as by the purity and nobility of his life. His attacks on evil living among the clergy, although in this he was supported by the Archbishop of Prague, won him much enmity.

Huss had early come under the influence of the religious and philosophical writings of John Wycliffe (*qv*). These were written in Latin, which was then the universal language of scholars, and so were as easily read in one land as in another. Huss adopted many of the philosophical and religious teachings of Wycliffe,

he did not follow him, however, in the rejection of the doctrine of transubstantiation, but held to the more orthodox belief. Nevertheless, when Huss opposed the Papal Bull ordering that Wycliffe's books should be burned, he was charged with heresy and forbidden to preach.

The struggle was complicated by the fact that this was the time of the Great Schism in the Church, when there were three rival claimants to be Pope. The climax came when Huss attacked the granting of indulgences in Bohemia by one of the three claimants for aid against his enemies, and the Pope's Bull was burned by his followers. Huss was now excommunicated, and for two years went into retirement to devote himself to writing.

When the Council of Constance met in 1415 to heal the Great Schism and consider the question of reforms in the Church, Huss attended it under a safe conduct from the Emperor Sigismund to justify his views.

On his arrival at Constance, Huss was thrown into prison. His condemnation was a foregone conclusion. When he steadfastly refused to recant his teaching, unless shown that they were in conflict with the Scriptures, he was condemned to death. As the sentence was passed he gazed steadfastly at Sigismund, who had the grace to blush with shame at the thought of his violated safe-conduct.

Huss met his death (July 6, 1415) with heroic constancy, as also did his disciple Jerome of

Prague, a year later "Thinking to extinguish heresy," says an English historian, "the Council of Constance had made it the national faith of Bohemia, and had made the martyr Huss the national hero and the national saint"

The immediate result was the terrible Hussite War, a struggle on the part of the Bohemians for national, religious and social revolution, in which they resisted the combined force of Europe in numerous "crusades," and for nearly a score of years prevented Sigismund from securing his inheritance of the Bohemian crown.

John Huss is now regarded as a national hero of the Czechoslovak nation, and a fine statue of him is a prominent feature of Prague. **Huxley, THOMAS HENRY** (1825-95) To appreciate fully the stature of this intellectual giant it is necessary to understand something of the spiritual and mental chaos into which the mid-Victorian age was plunged when Darwin in 1859 published his book called "On the Origin of Species by Means of Natural Selection"

No work, probably, has ever caused more controversy or aroused more hostility than did this daring pronouncement of the (then) new doctrine of evolution. It enraged bishops, distracted scientists and philosophers, and divided innumerable families. On the one hand, it was roundly denounced as rank "heresy" and the production of an atheist, on the other, it was praised to the skies as a work of genius which explained the universe and all in it.

The greatest men of the period, like Mr Gladstone, Bishop Wilberforce and Thomas Henry Huxley, were drawn into the controversy to champion one view or the other, for so heated a question had "Evolution v Christianity" become that there was no middle course to pursue, not even for the "man in the street," whose interest was now aroused, for the first time, in the question of his own ultimate origin. Newspapers and periodicals, public platforms and pulpits, debating societies and science classes were given up for years almost entirely to this one great question. Nothing like it has been witnessed since.

In that stirring period, when many believed that Christianity itself was tottering to its fall, Thomas Henry Huxley, Darwin's chief supporter, stood out pre-eminently as the defender of

intellectual freedom, as a fearless fighter for the right to doubt and the right to express honest convictions without having to endure slander and oppression from those who called themselves "orthodox." He, more than any man, by his published papers and popular lectures, brought science to the understanding of the mass of the people and aroused in them an interest in scientific matters that has increased steadily, until today science is taught in every school.

Son of a schoolmaster, Thomas Henry Huxley was born May 4, 1825, at Ealing, London. Self-educated for the most part, he won a scholarship to Charing Cross Hospital at sixteen, and at nineteen published his first scientific paper. At twenty-one—in 1846, that is—he became a naval surgeon on the survey ship "Rattlesnake," spending the next four years in the Torres Strait and thus beginning his great biological career in the same way as Darwin. His researches and papers proved so brilliant that he was elected a Fellow of the Royal Society and



THOMAS HENRY HUXLEY, 'DARWIN'S BULLDOG'

Huxley stands out among the pioneers of modern scientific thought, but rather as an exponent of the views of others than as an originator of new theories. When Darwin published his "Origin of Species" he found an enthusiastic champion in Huxley, who in the heated controversy which Darwin's book created met and overthrew many of its foremost critics by his logical and closely reasoned defence of the theories which it put forward.

From the portrait by the Hon. John Collier, National Portrait Gallery

awarded the Royal Medal when only twenty-five years of age. Thereafter Huxley lectured to students, continued his biological researches and published scientific papers until 1859, the year of Darwin's "Origin of Species."

He now became the leading champion of the new evolutionary doctrines, so much so that he was styled "Darwin's Bulldog." He took on all comers—ecclesiastics, scientists, philosophers and metaphysicians—and came through triumphantly. The great Gladstone, politician, philosopher and High Churchman, was generous enough to admit in later years that he should never have crossed swords with a scientist of Huxley's calibre. Even that celebrated controversialist, Bishop Samuel Wilberforce, whose skill in arguing with opponents earned for him the somewhat irreverent nickname of "Soapy Sam," was easily vanquished by the cold, logical clearness which characterized all Huxley's speeches and writings. The story is told that Huxley went once to a public meeting to hear Wilberforce denounce evolution, and there he found himself seated next to Thomas Carlyle. When Wilberforce told his audience that it was more Christian-like to believe that "Man was descended from angels rather than from monkeys," Huxley turned to Carlyle to whisper triumphantly, "The Lord has delivered him into my hands!" In other words, the bishop had confessed to a belief in "evolution," though not exactly on Darwinian lines!

A Crushing Reply

When Huxley got up to reply he soon showed that the bishop did not really know what he was talking about. A man, said Huxley, should have no reason to be ashamed of having an ape for his grandfather—though really, of course, the evolutionists did not maintain that men are descended from the present-day ape—but he *should* be ashamed of plunging into scientific questions with which he had no real acquaintance, and obscuring the issues by aimless rhetoric and appeals to prejudice.

Huxley had now come to be recognized as one of the greatest figures in scientific and educational life. Between 1862 and 1884 he served on ten important Royal Commissions, and from 1870–1872 he was a member of the London School Board. In these two years he helped to accomplish the final overthrow of the old scholastic methods.

Honoured by scientific societies and universities in all parts of the world, he was president of the Royal Society (1881–1886) and president of the British Association. He refused all titles and official honours except that of privy councillorship in 1892, and three years later he retired from public life. By this time, however, he had left his indelible mark not only upon science, but upon education, religion and

social reforms. Huxley died at Eastbourne on June 29, 1895.

Among Huxley's best-known writings are "Man's Place in Nature" (1863), "Lay Sermons, Essays and Reviews" (1872), "The Crayfish: an Introduction to the Study of Zoology" (1880), "Scientific Memoirs" (1898–1902), "Science and Hebrew Tradition" (1894).

Modern Members of a Famous Family

Huxley's great intellectual gifts were inherited by some of his descendants. His eldest son, LEONARD HUXLEY (1860–1933), after being a master at Charterhouse school, became editor of the "Cornhill Magazine," and wrote some polished verse and an admirable life of his father.

Leonard was the father of two famous sons, Julian and Aldous Huxley. The former of these, JULIAN SORELL HUXLEY (born 1887), after a brilliant career at Oxford, established himself as one of the foremost of the younger scientists. He became senior demonstrator in zoology at the University in 1919. He was professor of zoology at King's College, London, 1925–27, and Fullerton professor of physiology at the Royal Institution, 1926–29. In 1935 he was appointed secretary of the London Zoological Society. Besides many contributions to scientific literature, Julian Huxley has written many popular books on scientific subjects, while he has done much work in producing the educational biology films now shown in many schools. ALDOUS LEONARD HUXLEY (born 1894), third son of Leonard Huxley, gained fame as an exponent of the modern school of English fiction. One of the best-known of his books is "Brave New World," in which he forecasts possible future developments in civilization.

Hwang-ho, RIVER. Winding through the mountains and over the fertile plains of northern China flows the great and terrible Hwang ho ("Yellow River"), the "Sorrow of China." In its keeping are the lives and the fortunes of millions of people, and like a capricious giant it deals out death or wealth by turns. For thousands of years, since the earliest dawn of Chinese history, the people have struggled with this giant, trying to curb his strength, and today they are no nearer conquering it than ever.

The Hwang-ho rises in the mountains of Tibet, and through the first two thirds of its course the river, which is the second longest in China, flows through mountains, falling rapidly. The soil of these mountains is a yellow earth which dissolves easily and is washed down in enormous quantities by the river, staining its waters the deep yellow from which it, and the Yellow Sea, get their names. But as the river leaves the mountains and starts across the flat plains it begins to deposit this sediment. By degrees the bed rises and the people build embankments to prevent the river from overflowing.



ON THE BANKS OF THE HWANG HO

This photograph shows a section of the bridge which crosses the great Hwang-ho river at Lanchowfu, where the river is 700 feet wide. The bridge was built in 1909. On the right is a portion of the city wall, and beneath it is the market.

As the bed rises the embankments must be raised, too, until the stream is flowing many feet above the level of the surrounding country. As time goes on, the situation becomes more and more dangerous, finally a breach occurs and the whole river pours over the country, carrying destruction and ruin with it. If the breach cannot be repaired the river leaves its old channel entirely, and finds a new exit to the sea along the line of least resistance. Many times it has thus changed its course, entering the sea through different mouths as much as 500 miles apart.

In 1851 the river made such a change, and since then it has flowed to the north instead of to the south of the rocky peninsula of Shantung. It took 15 years to repair the damage. The southern valley from being a well-watered fertile plain was left practically without water. The northern valley was also injured for a time, because the river deposited three feet of sand and mud over the fields.

This northern valley became later very fertile, because of the new water supply. In 1887 another flood occurred which swept away whole villages, killing more than a million people and flooding 50,000 square miles of territory.

Although the Hwang ho is the second river in China, it is too shallow in winter and too swift in summer to be navigable. Its total length is about 2,700 miles.

Hyacinth. The ancient Greeks told this story of the origin of the beautiful and fragrant hyacinth. One day, said they, the god Apollo was playing a game of quoits with a young mortal, Hyacinthus, whom he dearly loved, when Zephyrus, the god of the west wind, passed by.

Being jealous of Apollo, the west wind blew the latter's quoit aside, and caused it to strike poor Hyacinthus, inflicting a mortal wound. In a few moments Hyacinthus died in Apollo's arms. In his memory the grieving Apollo then caused these beautiful clustered blossoms to spring from the fallen drops of his blood.

At all events, we know that the wild hyacinth, *Hyacinthus orientalis*, was originally found in Greece and Asia Minor. Brought to western Europe in the 16th century, the hyacinth was extensively cultivated by Dutch horticulturists. They succeeded so well that the original blue and purple blossoms were varied to numerous shades of pink, rose, yellow, scarlet, and pure white, so that today we have a splendid selection from which to choose, while many varieties are also double flowered. The bluebell (*q v*) is also often called a wild hyacinth, but it belongs to a different genus and has drooping flowers and stems less stiff than those of the true hyacinth.

Hyderabad. In the centre of the peninsula of India, between the provinces of Bombay and Madras, lies Hyderabad, the largest and most important of the native states, with an area of 82,698 square miles, and a population of about 14,400,000. Its ruler is the "Nizam,"



HYACINTHS GROWN INDOORS

Few indoor flowers are so popular as the hyacinths, especially since these lovely blooms have been obtainable in so great a variety of colours. Those you see here are typical examples, with thick, short leaves and short spikes crowded with the spreading, waxy flowers.

HYDERABAD

whose wealth and power surpass that of any of the other princes of the Indian Empire

In the 17th century Hyderabad was a province of the Mogul Empire whose capital was at Delhi, but with the decline of that power in the 18th century, the Nizam became independent. The ruler and the government officials are still Mahomedans, although the people are chiefly Hindus. In the great Indian Mutiny of 1857 the Nizam remained loyal to the British, and his successor was one of the most active Indian princes on the Allies' side in the World War.

Hyderabad is a plateau about 1,200 feet above sea-level. It is rich agriculturally and has great mineral wealth, especially coal. Irrigation, railways, and manufactures have brought great prosperity to its rulers. The products include millet, rice, wheat, oil-seeds, cotton, tobacco, sugar-cane, tussore silk, lac, gums, and oils.

But of greater interest to visitors are the relics of India's historic past which abound in this region. Chief among these are the marvellous temples at Ellora and at Ajanta in the north-western corner of the Nizam's dominions. The majority of these temples consist of caves

HYDRA

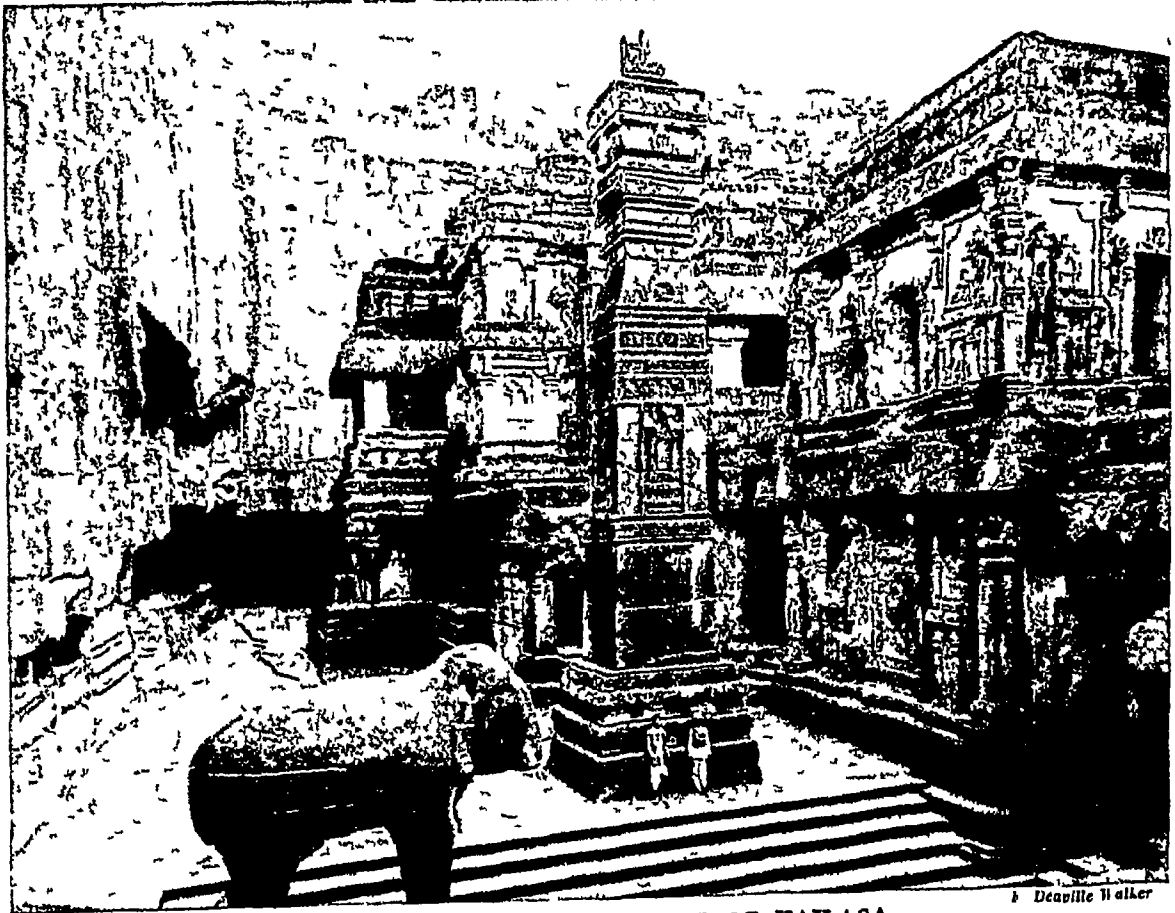
carved out of the rock and decorated with weirdly beautiful designs and figures made at the cost of enormous labour.

The Kailasa at Ellora is looked upon as one of the wonders of the world, for not only was its interior hewn out into great chambers and altars and bas-reliefs, but the outside of the rock-bound hill which forms its roof was chipped off bit by bit and fashioned delicately into an exterior of graceful and intricate design.

The city of Hyderabad, capital of the Nizam's state, is the fourth largest city in India (population, about 466,000). On the opposite bank of the river Musi stands the British Residency.

By the Indus delta, in the Sind region of north-western India, is another city called Hyderabad, but it is of less importance than the one described above. It has a fortress, however, and an arsenal, and produces good lacquered ware, silks and embroideries.

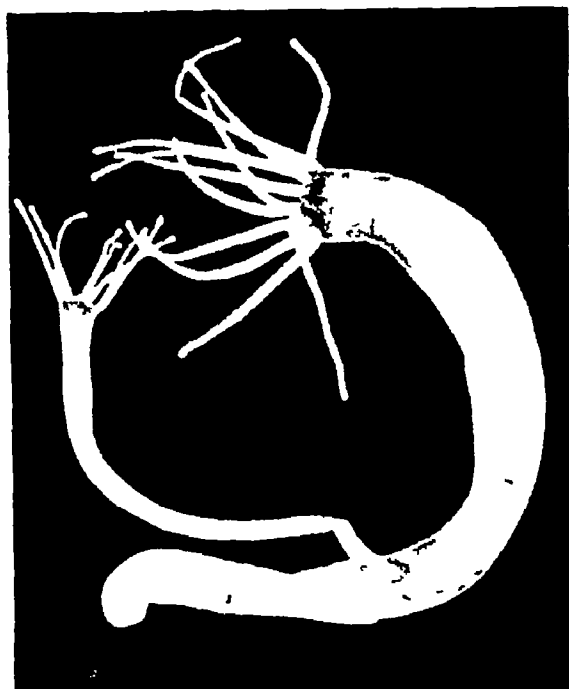
Hydra. Gather in a bottle some of the floating green weeds or submerged plants or stones from a stagnant pond and empty them into a glass bowl filled with clean pond water. You may then find attached to the plants the tiny



HYDERABAD'S GREAT TEMPLE OF KAILASA

One of the most wonderful achievements of Man's hand and brain is this great rock temple of Kailasa, hewn out of solid rock. It was begun in the 8th century A.D. and took a hundred years to complete, for some 3,000,000 cubic feet of rock had to be removed before the work of carving the masses that remained could be begun. This photograph shows a small portion of the Temple with the tall escarpment of the cliff, over 100 feet high, created by the excavators. The elephant, seen in the foreground, rather mutilated, is about life-size.

HYDRA



J. G. Bradbury

TWO HYDRAS FROM ONE

The green hydra, of which you see here a very highly-magnified photograph, is one of the commonest microscopic creatures of the pond. Here one of these creatures has just become two, by the simple process of 'budding' off a daughter hydra from its own body.

freshwater creatures we call "hydra." But you must become a scientist for five minutes, in order to enjoy and appreciate these small, lowly, and inconspicuous but very interesting members of the animal kingdom.

Hydra a monster? Yes, to the many small animals it preys on, and it does resemble the many-headed Hydra monster of Greek mythology (see Hercules) from which it was named. Picture it thus: about the size and shape of the pointed half of a common pin, the plain end sticky, to attach it to any objects in the quiet fresh water of ponds and streams where it lives, in the free end the mouth, capable of opening wide, and surrounded by a circle of about six or eight thread-like tentacles.

Imagine the pin a tiny chimney made of two layers of bricks on end, these being the two simple layers of cells in the hydra's body-wall. The cavity inside is the stomach, and this is almost its only organ. The hydra has no sense organs, no skeleton, and no nervous, breathing, blood, or other system.

You see hydra was one of Nature's first experiments in building animals out of different kinds of cells (See Cell). But, once discovered its plan was used for all of the great branch of animals to which the hydra belongs—thousands of kinds of polyps, sea anemones and jelly-fishes. Some of its relatives, moreover, branched out, as it were, with their many organs and systems for various uses.

HYDRANGEA

The hydra forms daughters mostly from buds on its sides but in the autumn it produces bodies equivalent to eggs, which hatch out in the next spring. When a hydra is injured, lost parts are quickly restored, or "regenerated," as the scientist says. If it is cut into a dozen pieces, each piece will soon form a complete hydra. Curious stinging cells armed with poison are situated in the tentacles, and these paralyse the small animals that swim against them, enabling the hydra to capture them with the tentacles, and then swallow them.

The few species of hydra, mostly world-wide but seldom abundant, are almost the only freshwater representatives of their great branch of the animal kingdom (the *Coelenterata*). That is one reason why the biologist prizes them so highly. The name hydra comes from the Greek *hudos*, meaning "water." Two of the more common species of hydra are the brownish *Hydra oligactis*, and the green *Hydra viridissima*.

Hydrangea. "Won't you walk into my flowers?" says the hydrangea to the pollen-bearing insects, flaunting her showy outer cluster of sterile flowers which have neither stamens nor pistils and serve only to attract her six-footed visitors in the direction of the small bashful fertile flowers inside.

The hydrangea (*Hydrangea hortensis*) is a large ornamental shrub with a big globular head of flowers, usually pink, but sometimes bluish or white, and is a member of the *Saxifragaceae*. There are more than twenty-five kinds of hydrangea, found chiefly in North and South America, China, Japan, and in the



HYDRANGEA MASSES R. A. Malby

For growing in large pots or vases out of doors, there is perhaps no flower so popular as the hydrangea. Its blooms—white, blue or pink in colour—are greenish when in bud but, whatever their final shade they are equally lovely, and as they grow in great masses provide a wealth of colour.

HYDRAULIC

mountains of India. Perhaps the kinds we know best are those grown as attractive border plants for our gardens, sometimes 8 to 10 feet high. We are familiar, too, with the dwarf variety grown in pots.

Hydraulic Machinery. Let us see, from a study of the examples in the opposite page, how hydraulic machinery works. From a spring basin some 12 feet above the ram, as a hydraulic pump is called, an iron supply pipe brings the water to the ram beside us.

The water begins to flow out through a waste valve and is carried off, but presently the increasing force of the water pushing up against the valve closes it, and it shuts with a click. The column of water is in this way instantly arrested, just as it is when we turn off a tap.

The recoil hurls the water against an inner valve, opens it, and, as the water rushes in, the air in the rounded chamber above is compressed. With the recoil of the water the pressure on the waste valve is lessened, the valve drops open, again providing an outlet for the water, which now turns in that direction.

When the water turns, the compressed air cushion in the air chamber expands, closing the valve to the supply pipe, and forcing the water through a delivery pipe. The waste valve is again closed by the rush of water, and the hammer-like blow comes again at the air chamber valve.

This process is repeated again and again, and as long as the process continues the water is pumped steadily to a height much greater than its source, with no other force than the energy developed by the fall of the water itself.

With a copious enough flow of water and a fall of from 1½ to 10 feet, a water supply can be lifted as much as 250 feet by this means.

Clean Water Raised by Dirty

The recoil of the water can also be made to drive the sliding piston of a pump attached to the body of the ram, the piston lifting and pumping water through ordinary pump valves. With this arrangement a ram working with muddy water may be used to raise spring water.

The hydraulic ram is only one of many machines operated with water power. These machines are possible because liquids are, for all practical purposes, incompressible, and pressure exerted on any part of liquid in a closed vessel will be transmitted equally to all parts of the liquid. This principle was discovered by Pascal, the great French thinker who lived in the 17th century.

One of these machines, the hydraulic press, is so powerful that a man, working an ordinary pump handle, can lift hundreds of tons of weight with it. It seems that this would be possible only with very complicated machinery, but as a matter of fact the hydraulic press is very

HYDROCHLORIC

simply constructed. We have a tank containing two pistons, one much smaller than the other. If the smaller piston is 1 inch square, and the other 30 inches square, and we exert a pressure on the smaller piston of 100 lb, the larger piston will hold up a weight of 100 lb to each square inch of its surface— $30 \times 30 \times 100$, or 90,000 lb. If the small piston is a pump that lets in more water with each upstroke, the large piston is slowly but surely raised, exerting its enormous pressure.

Before more rapid machinery was invented the hydraulic press was in general use for pressing cotton, paper, or hay into bales, for squeezing oil from cotton-seeds, and for punching holes in steel plates. Lead and tin pipes are sometimes made with the hydraulic press. These metals become plastic under tremendous pressure, and flow out of the prepared orifices in the same way that macaroni is forced from the machine in which it is made.

Engines Driven by Water

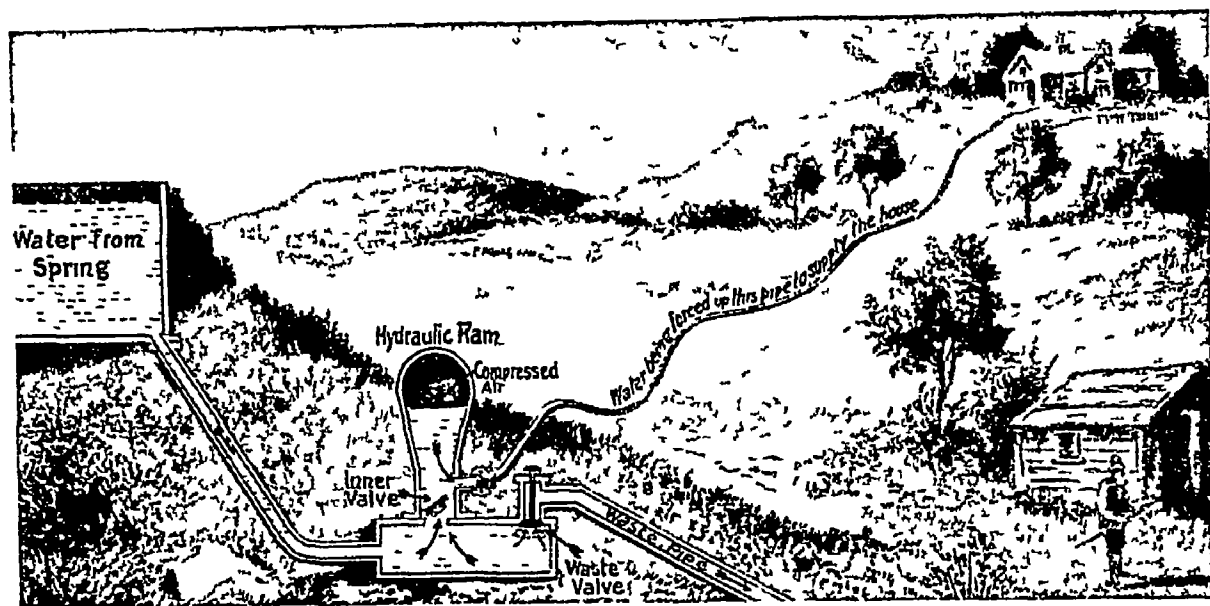
In hydraulic engines, water under pressure pushes back the piston head until a sliding valve is opened by which it flows out. These engines are slow, and have been largely replaced by electric motors, although they are still occasionally used for hydraulic lifts or machines for pumping air for pipe organs. Turbines and water-wheels are other forms of powerful machinery operated by water power, and used for many purposes. (See Turbines)

"Hydraulics" (from the Greek *hudos*, "water," and *aulos*, "pipe") is the name which we give to the science which treats of the flow of water or other liquids in motion. It is partly theoretical, based on the general laws of fluid motions as developed in hydrodynamics, but largely experimental. It has to do with the flow of water through pipes and canals and over weirs and dams, and with the use of rivers and streams for power purposes. The designing of canals, aqueducts and pipe lines for drainage and public water-works is an important application of the science of hydraulics. (See also Water Power)

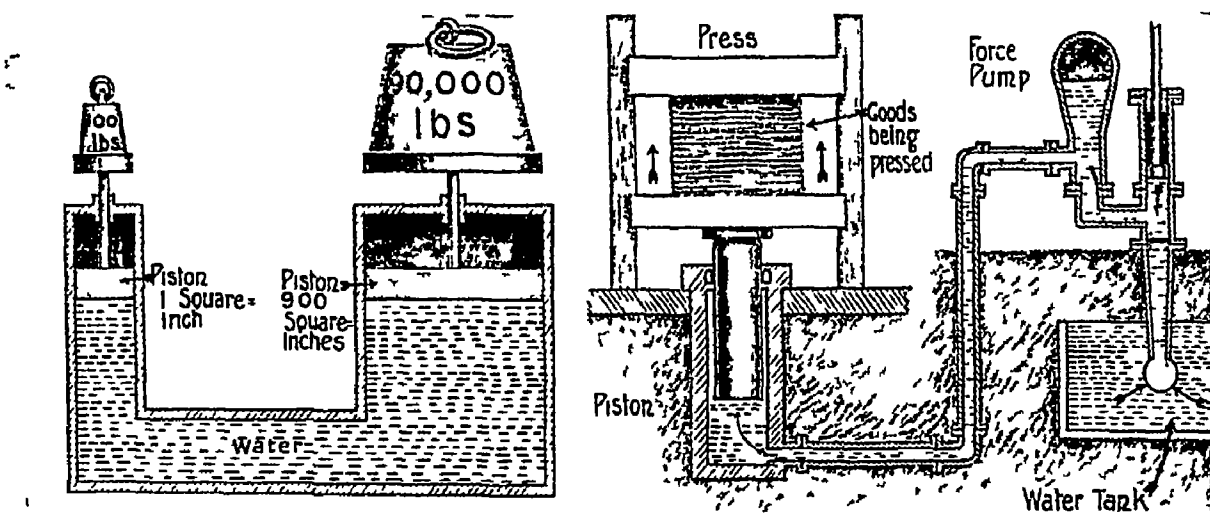
Hydrochloric Acid. One of the most important acids in scientific work and in industry is this colourless compound of hydrogen and chlorine (HCl). It is manufactured by treating common salt (NaCl) with sulphuric acid (H_2SO_4), yielding sodium sulphate as a by-product, also by burning chlorine gas inside containers filled with hydrogen. The pure product is a gas (hydrogen chloride), which develops acid properties only when dissolved in water. A cubic foot of water will absorb 455 cubic feet of the gas.

Gastric juice contains normally 2 per cent of hydrochloric acid. It helps to dissolve the minerals in our food and acts in part as an antiseptic. Hydrochloric acid unites with most

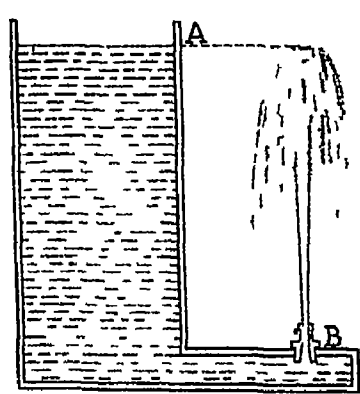
SOME OF THE WONDERS WORKED BY WATER POWER



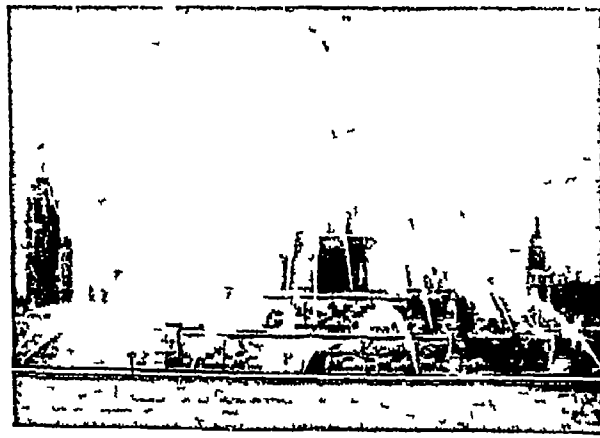
Here you see how a hydraulic ram forces water to "run up hill." From the spring reservoir, the current first passes down through the lower part of the ram and out of a waste pipe, until it gains sufficient speed to close the waste valve. This checks its course suddenly, and its momentum carries it up through the inner valve, greatly compressing the air in the air chamber. Once the water loses its momentum, the compressed air forces it back, but this closes the inner valve, and so the water has to go up the supply pipe. At the same time, the rush of pressure being removed, the waste valve opens again, and the whole process repeats itself over and over.



Here we see how a hydraulic press gets its enormous power. The small piston has a surface equal to one square inch. It pushes on the water therefore, with a pressure of 100 pounds to the square inch. When this pressure is carried over to the larger piston, with a surface of 900 square inches, you naturally get a total pressure there of 90,000 pounds. The picture at the right shows how this principle is used in an actual press.



Hydraulic pressure may make the water play in a fountain as lively as the one at the right. A simple diagram, at left, shows the principle. The water confined in a tank reaches the level A. It is allowed to run out in a pipe at the bottom with an outlet, B, where pressure from the tank makes it spurt up in a fountain.



HYDROCHLORIC

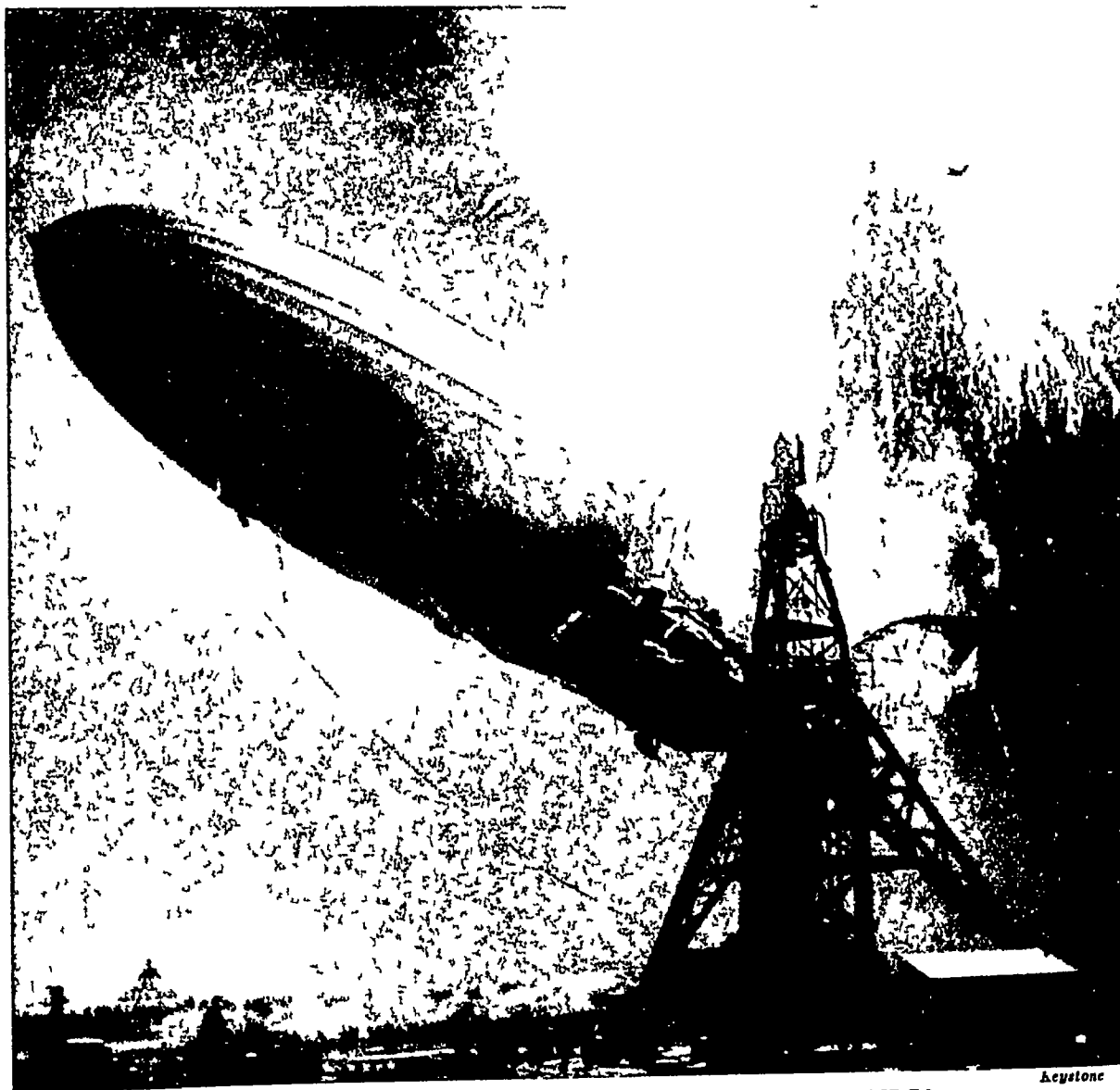
metals and metallic oxides to form salts known as chlorides (See Chlorine)

Its greatest commercial value is as a source of chlorine for the great alkali and bleaching industries. Formerly, when soda factories produced sodium sulphate by the Leblanc process of treating ordinary salt with sulphuric acid, the hydrochloric acid gas was allowed to escape into the atmosphere. As it killed neighbouring vegetation and was generally objectionable, very high chimneys were built to disperse it. But this method only spread destruction further afield, and led to the practice of dissolving the gas in water and allowing the hydrochloric acid so formed to run into the nearest river. Unfortunately, it was found that this killed all the fish, and complaints against soda factories became greater than ever.

HYDROGEN

Then came steam printing and a greater demand for paper, which resulted in the invention of wood pulp as a suitable raw material for paper, if only it were bleached. This led to experiments with the waste hydrochloric acid of the soda works, for it was well known that the chlorine element of the acid was a powerful bleaching agent. A simple inexpensive method of decomposing the acid and retaining the chlorine was soon discovered, so that, instead of being allowed to run to waste, this by-product of soda factories became of great value.

Hydrogen. When a cold flask is heated over a gas flame, beads of water gather on its base as if it were sweating. Is it leaking? No, the flame itself is manufacturing water, for the gas contains the element hydrogen, which forms water (H_2O) when it burns or unites with



Acystone

EXPLODING HYDROGEN DESTROYS THE 'HINDENBURG'

This remarkable photograph shows the terrible force with which hydrogen explodes when mixed with air. The giant airship, the Hindenburg, blew up just as she was being moored to the great steel tower at Lakehurst, New Jersey, U S A on May 8, 1937. Had the gigantic "ballonets" inside her hull been filled with the inert gas helium, this tragedy could never have occurred, for this gas cannot explode. But helium is very expensive, and also it is only about one-half as buoyant as hydrogen.

HYDROGEN

oxygen Hence comes its name, which is from the Greek words meaning "water-former"

One of the most interesting of the whole group of chemical elements is this colourless, tasteless, odourless gas called hydrogen We meet its compounds everywhere—in animal and vegetable tissues and products, particularly the carbohydrates (sugars, starches, fats, and celluloses) and hydrocarbons (natural gas, petroleum, and coal tar products), and in the universal and indispensable form of water Hydrogen is also found in all acids, of which it is the essential and characteristic constituent Yet it is very seldom found uncombined

Hydrogen, however, is not active, at ordinary temperatures it is lazy or chemically inert toward most other elements You can shut free hydrogen up with free oxygen at an ordinary temperature, and at the end of years you will find that they have made no perceptible progress towards becoming water A spark is needed to effect the marriage When hydrogen burns it produces a very high temperature In the oxy-hydrogen blowpipe, streams of hydrogen and oxygen in the proportion to form water are forced under pressure from separate containers through a jet, igniting as they issue The flame produces a temperature of 5,000° F

Wherever free hydrogen exists, it tends to escape into the upper atmosphere, for hydrogen is the lightest element known—14 times lighter than atmospheric air That is why it is the usual filler for the gas-bags of balloons Its inflammability, however, is a serious drawback, and aeronauts are glad to welcome another element which, though a little heavier than hydrogen, is non inflammable (See Helium)

Another odd thing about this remarkable gas hydrogen is that its chemical actions in many ways resemble those of metals The more active metals displace it from water and dilute acids From some of the compounds of metals with oxygen and chlorine, it will in turn displace the metals For commercial purposes, hydrogen is obtained chiefly as a by product in the manufacture of caustic soda (sodium hydroxide)

The hydrogen, released by the electrolysis of a solution of salt in water, is collected and compressed in steel cylinders It may also be obtained by liquefying water gas, which is a mixture of hydrogen and carbon monoxide, obtained when steam is blown over red hot coke The hydrogen evaporates more readily than the carbon monoxide and is easily separated

The chemical symbol of hydrogen is H Its atomic weight is 1 (or 1.008 according to the more recent international table of atomic weights) It has been liquefied at -423° F and solidified at -434° F Sir James Dewar (1842-1923), of vacuum flask fame, achieved its liquefaction in 1898 and its solidification in 1899

HYENA

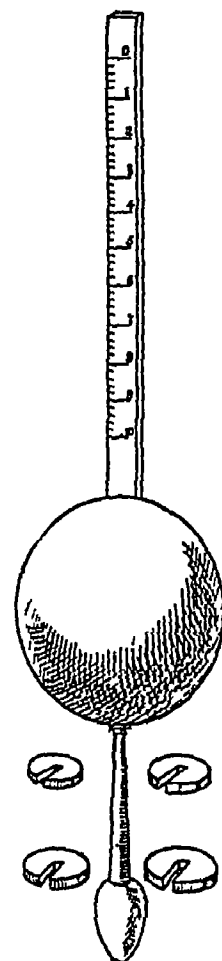
Hydrometer. Since a floating body sinks proportionately further in a light than in a heavy liquid, the relative weight or specific gravity of liquids can be determined in that way

Instruments for this purpose are called hydrometers Usually, they consist of glass tubes, weighted at one end to hold them upright, and marked with a suitable scale This scale may indicate directly the ratio compared to water, or may be arbitrary degrees like those of the Baumé scales

Hydrometers are used to test the strength of the solution in accumulators, to determine the richness of milk, and to gauge the "gravity," or alcoholic content, of beers and spirits

Hyena. (Pron hi-ē'-na) This unpleasant animal, about the size of a large dog, is noted for its cowardice and the unearthly shrieks, like the laughter of a maniac, which it utters when excited The various species live in caves and ruins in central and southern Asia, and in Africa, and come out at night to feed on carrion and start their dismal howling

The hyena performs a valuable service to the health of the communities which it infests by devouring dead animals and thus acting as a scavenger So cowardly that it rarely attempts to defend itself, it



HYDROMETER

The construction of the instrument is shown here The different-sized weights for different liquids are fitted near the smaller bulb at the bottom

does not dare to attack an animal that is standing still, but it often so terrifies horses and cattle that they run till they fall from exhaustion Then the hyena tears its victim to pieces It was formerly much dreaded in South Africa, where it often entered Kaffir dwellings at night and carried off children even when they were sleeping by their mothers

These carnivorous animals are related in structure to the cats and the civets They are ungainly creatures with large heads, and their forelegs are longer than the hindlegs, which gives them an awkward, shambling gait, while they are further distinguished from all other large carnivora, except the African hunting dog, by having only four toes on each foot and by the non retractile claws Their powerful teeth and jaws are capable of crushing the hardest



HYENAS AND JACKALS AT THEIR HORRID FEAST

These are striped hyenas, feasting on the carcass of some creature, killed by a lion, perhaps, and left half-eaten for the desert scavengers. Two jackals have come up, and these four slinking creatures are snarling at one another over the meal. Hyenas love bones, and so powerful are their jaws they can crack even the leg bone of an ox and so get at the marrow. Actually, by their scavenging habits they do a good deal of useful work.

bones. There are three varieties of the hyena: the striped (*Hyaena striata*), the spotted (*H. crocata*) and the brown (*H. brunnea*). Probably no other animal has such a reputation for

downright bad character, and it is therefore a striking fact that even the hyena, when in captivity, has the capacity of regarding his master with affection.

The SCIENCE of HEALTHY LIVING

We live today in such artificial conditions that, unless we keep our bodies in good condition, we are likely to fall into more or less permanent ill-health. Some main rules of hygiene are given here

Hygiene. You live in a little house all by yourself. It is your body. People who own houses take care of them, and try to live in them just as comfortably as they can. The first thing necessary to live comfortably anywhere is to keep everything sweet and clean.

It is much better to use a house than to let it stand idle. Things rust out quicker than they wear out. So it is with your body. You must use every bit of it, every day, and live in every corner of it. The bones and muscles become weak and stiff if they get no exercise. Working muscles and bone call for more blood. This compels the heart to beat faster and stronger and the lungs to call for more air to keep the blood purified. All parts of the body should be exercised equally. Swimming, rowing, skating, bicycle riding, dancing and plain walking in the fresh air are splendid exercises.

Games like cricket, football, and tennis are fine, too. They train both mind and body to think and act quickly. (See Physical Training) Don't do anything half-heartedly or in a slovenly fashion. Study hard and play hard.

Next, "don't worry!" You know "care killed the cat," and cats are supposed to have nine lives. Don't hurry, or overwork, or overplay. Don't lie awake and think about "that examination." If you do your best every day, you don't need to worry, and if you don't do your best, worrying will only make it worse. If your brain is to do good work it must have sleep. Eight hours for work, eight for eating and playing, and eight for sleep, is a good rule for grown people. Children should have less work, and more play and sleep.

Eat at regular hours. Eat enough at meal times, and don't eat between meal-times. It

HYGIENE

takes several hours to empty a stomach Don't make a meal of one kind of food because you like it A dinner all of meat, potatoes and pie might suit an ostrich, but is too heavy for a human being A mixed diet is best for human beings (See Food)

Wash your hands before you eat, or else you may get disease germs in your food Take time to eat and chew your food well Many grown people eat as if they had to catch a train This is a greedy, unpleasant habit Besides, it is harmful In chewing, the mouth makes a liquid (saliva)



BEFORE EVERY MEAL

It ought to be a natural instinct not to sit down to a nice clean table with dirty hands and yet many boys and girls do it.

that the stomach needs for digestion If you eat too fast, the mouth hasn't time to make enough of it, thus throwing extra work on the stomach and contributing to indigestion Besides, your teeth need exercise The broad grinding teeth, or molars, in the back of the mouth usually decay first That is because we use them less than we do the front, cutting teeth, and not as Nature intended Don't over eat If you fill a furnace too full of coal you smother the fire Doctors often have to be called to help people to digest the over generous Christmas dinners they have taken (See Digestion)

When you were rubbing yourself dry, after a bath, did you ever rub little rolls up on your skin? That was dead skin, dust, dried sweat, and oil Warm water, soap, and scrubbing with a brush remove it If not removed, it injures your health and makes you unpleasant to other people To keep the skin clean and healthy, a warm bath should be taken twice

or more a week

Your hair must be shampooed as often as every ten days or two weeks, for dust, oil, perspiration and dead skin collect on the scalp, too The hands and face are outside in all weathers, all the time, so you must get into the nooks and corners of ears, nose, knuckles and finger-nails every day The teeth must be brushed after every meal, and the mouth rinsed In a warm, moist mouth bits of food quickly decay You cannot keep your food grinders and cutters for 70 years or more



AND THE TEETH!

Dirty teeth are not only very disagreeable things to look at—and to have—but they are a cause of much disease

unless you take great care of them (See the article on Teeth)

The morning shower or plunge bath in cool water, followed by a brisk rub down with a coarse towel, brings the blood to the skin and makes you feel warm and bright and active It makes you less susceptible to sudden changes of temperature, so you do not "catch cold" easily Don't forget to drink plenty of pure water Drink four to six glasses a day, and more as you grow older Water washes through all the waste pipes of the body and cleans them It is best to drink before breakfast, between meals and at bed-time Water at meal-times dilutes the digestive juices in the stomach too much for proper digestion

When the lungs are filled with air, they expand two inches or more That is why your clothing should not be too tight The lungs go down almost to the waist line You should breathe deep and full Slow, deep breathing for five minutes before an open window immediately you rise every morning is one of the most healthful of simple exercises Clothing should be warm enough for the weather, but not so heavy that it tires you to wear it The weight should hang from the shoulders, not from the hips Don't wear shoes in which you



FRESH AIR IS SO CHEAP

Some people, when they go to bed, shut their windows to keep out the night air That is a habit that may lead to a cold in the head

cannot wriggle your toes Shoes for children should have straight, broad soles and good-sized heels

Don't be afraid of fresh air Use it all the time There is plenty of it and it costs nothing Your lungs do not like to

breathe second-hand air They need the oxygen that is in fresh air (See Air) A great

many people are "afraid of night air" That is nonsense Doctors cure people with sick lungs by making them sleep out of doors You can keep your lungs well by sleeping with the windows wide open and putting on enough bed clothes to keep warm

Breathe through the nose, not the mouth The nose warms and moistens the air and has countless little hairs that catch the dust and keep it from getting into your lungs If you cannot breathe through your nose, you possibly have "adenoids," which are excessive growths of lymph tissue in the space between the back of the nose and the throat Adenoids are bad for the health in many ways, and they should be

HYGIENE

removed by a specialist Children who have adenoids also have in many cases enlarged tonsils, which cause frequent sore throats and other disorders, and therefore should be treated by a doctor (See Respiration)

Fresh air never made anyone "catch cold" But impure air, living in houses that are too warm

and close, sitting in draughts when overheated, and sitting with wet clothing and feet, will often lower the body's resistance and make you catch cold. Keep warm and dry, well-fed, clean, active and cheerful, drink pure water and breathe fresh air, and you will keep well. Don't go where you know there is anything "catching." People used to think all children had to have measles, mumps, and whooping-cough, and that these diseases were

not serious. Now we know they are often serious, and that we may escape them if we avoid the germs that cause them (See Germ Theory of Disease). Scarlet fever and diphtheria are very dangerous. Don't drink from a public drinking-cup, because it is very likely to contain the germs of some disease.

Finally, don't sit "humped up" in a chair or at a school desk. Raise your chest, hold your head up, whether you are sitting, standing, or walking. Wrong habits of posture make narrow chests, round shoulders, and curved spines.

A dentist should examine your teeth twice a year. Even baby's teeth should be kept clean, and cavities in them should be

filled. That will make them last longer, keep the stomach healthier and make the second teeth stronger and better in every way. It saves money and pain, too.

If there are singing or buzzing noises in the ears, if the ears ache often or pus runs from them, or you cannot hear what people say to you easily, you should go to an ear specialist.

Usually, ear troubles in children are easily cured, but if the trouble is neglected they may become very deaf. Often children in school are thought to be stupid when they are only hard of hearing (See Ear).

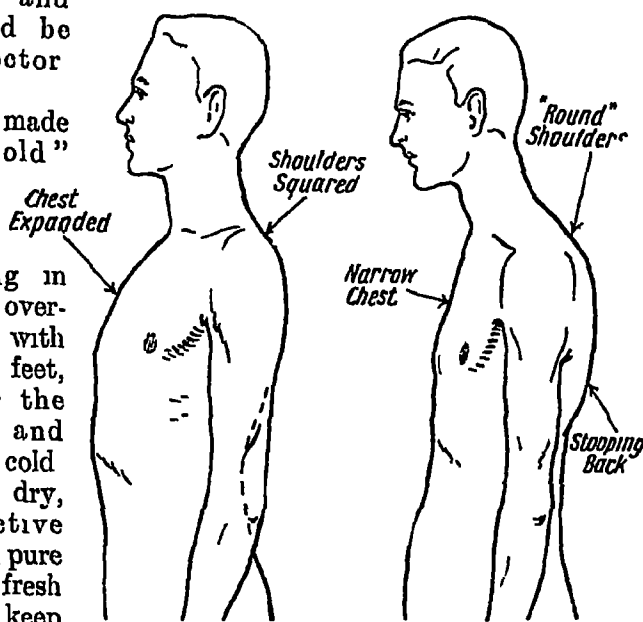
Your eyes are the windows of your soul. They should be clear and bright, for you cannot see through dim glass. If print blurs, or spots dance before your eyes, if you cannot see without squinting, or cannot recognize a friend across the street, or if you often have a headache after studying, when you feel well otherwise, you may need to wear glasses. You can injure good eyes in several ways. You must not read very fine print for too long a spell, or read by a dim light. The light should fall on the page or the work you are doing, not in your eyes, and it should not dazzle. If your eyes feel

tired, rest them by bathing them in cold water and closing them for a short while.

A wise mother knows a great many things to help boys and girls over small troubles. But if the trouble is something she doesn't understand, it is best to see a doctor. Don't take patent medicines. If you are so ill that you need medicine, probably you don't know the kind you need, nor how any kind will affect you. And a great many patent medicines have poisons and dangerous drugs in them (See Drugs, Medicine and Surgery).

So much for the care of your body. But there is another side to hygiene that is just as important and it deals with the household.

The house in which you and your family live must be kept clean from cellar to roof. If there is a basement, this should be light and dry and airy. Once a year the walls of the cellar should be whitewashed. The living rooms should be thoroughly cleaned at least twice a year, and the walls distempered or painted once. If the walls are papered, the paper should be cleaned. Hardwood floors, with small rugs, are the best floor coverings because rugs can be cleaned out of doors and the floors washed. Iron or brass beds are cleaner than wood. Window draperies and all bedding should be washable. Vacuum cleaners or carpet sweepers and soft cloths should be used for sweeping and dusting,



THE ART OF CORRECT BREATHING

Posture is a matter of great importance in breathing. A person should stand erect with his shoulders thrown back, a position which automatically expands the chest, and with the abdomen drawn in. Right, are shown the round shoulders, contracted chest and protruding abdomen that result from a slouching gait and a careless sitting posture.



HOW TO SIT

When reading you should sit up nice and straight, like this. So many children get all humped up when they are reading.

WHY DR. SUN IS THE BEST OF HEALTH-GIVERS



THE SUN is the greatest doctor in the world! But only lately have the world's doctors understood just how the sun manages to give us his medicine. The mystery lies in "ergosterol," a chemical in our skins, and in "ultra-violet rays," certain of the sun's rays which you can't see. These rays give us a fine coat of tan activate the ergosterol, and create what is known as vitamin D. This vitamin enables our bodies to make proper use of the lime and mineral salts in milk and vegetables, so that our teeth and bones may grow strong. The youngsters building a snow fort (above) while the sun browns them, and the baby having a gorgeous time on the beach, are getting vitamin D in the easiest, pleasantest way. The very good girl, below, taking cod-liver oil without complaint is getting it, too, for cod-liver oil is just full of vitamin D. But even the sun bath can be overdone. Never stay too long in the sun just long enough to feel invigorated.



ARTIFICIAL SUNLIGHT, containing even more ultra-violet rays than the natural sunlight, is now produced by carbon arc and mercury-vapour quartzlights. It has been found that by irradiating certain foods they can be made to contain vitamin D. The picture at the upper right shows the equipment used in irradiating cereal products by a process discovered by Prof. Harry Steenbock of the University of Wisconsin.

LAMPS which bathe the patient in artificial sunlight are now successfully used. Physicians warn, however, that these lamps are dangerous in the hands of the amateur, who should never use them except when following a doctor's instructions.



HYGIENE

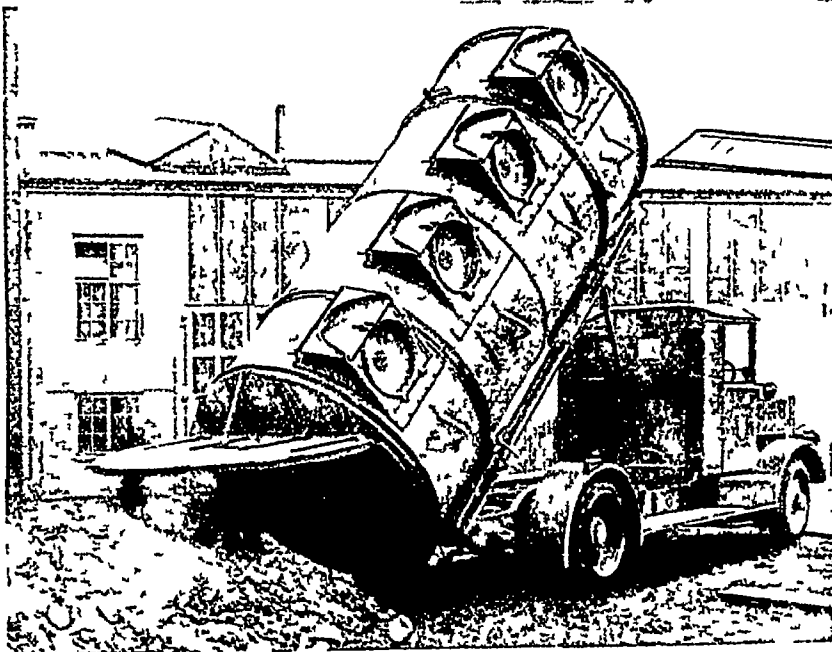
because brooms and feather dusters scatter dust. The waste pipes of kitchen sinks, laundry tubs and bathroom plumbing become foul with decaying matter. They must be flushed every week or so with boiling water and washing soda or chloride of lime to get all dirt out. Sunlight and soap are great purifiers, so plumbing should never be boxed in. Old, dirty, boxed-in plumbing is often responsible for sewer gas or foul air about the house.

Stale food should not be allowed to remain in pantries. Garbage should be burnt every day, or placed in a dustbin with a properly fitting lid, ready to be taken away by the dustman. There should not be a crumb of bread or sugar left lying about to attract flies. Flies bring the germs of serious fevers and other diseases, so doors and windows should be screened. Food should be fresh. Flour and many dry foods may be kept for months in dry store-rooms. If unfit for use they smell mouldy. Meat, butter, eggs and milk also warn us of decay through our noses. Fruit that cannot be eaten while it is fresh should be cooked.

A family should be sure the drinking water is pure. Uncontaminated spring water is the best and purest of all. In cities water is supplied from

reservoirs fed by springs or rivers, or from a lake. Sometimes it is necessary to filter or boil the water. Boiled water should be cooled and air should be put back into it by pouring it from one vessel to another several times. This must be done because boiled water tastes "flat." It is not unhealthy, but people care so little for it that they will not drink enough. Water in city reservoirs is often purified with chloride of lime or other harmless chemicals. (See Waterworks.)

Heat is the next important thing. You do not want a hot-house. Hot-houses are useful for



PROGRESS IN REFUSE COLLECTION

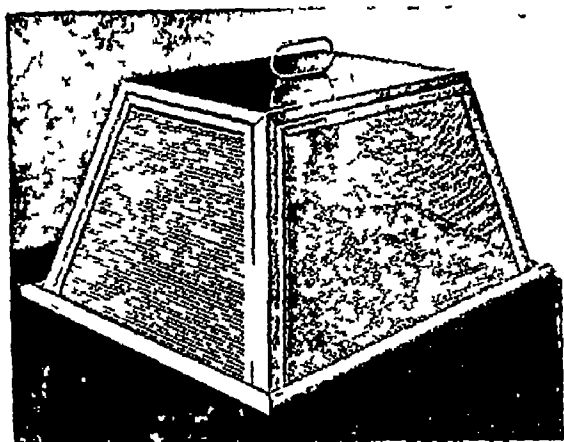
An interesting comparison in methods of refuse collection is seen here. Above, the exceedingly unhygienic method of the open dust-cart which spreads dust and dirt and germs at the same time; below, the "Trommel Wagon" system, with its four self-closing receivers, shown tipping its load on to a municipal dump.

growing delicate plants. Hot dwelling-houses grow delicate people. The temperature of a house should be 55 or 60 degrees by a thermometer hung in the middle of the room. And it should be an even temperature, not 70 for a little while and then 50.

Ventilation should be studied. Fireplaces are the best ventilators, even when there is no fire in them, for bad air is drawn up the chimney. A window lowered from the top for a few inches in cold weather lets fresh air in between the sashes, and the bad air out above.

The time we need to be most careful about ventilation is in the winter. On cold winter evenings all the family likes to sit in the cosy living-room. If the ventilation is poor, in an

HYGIENE



WHERE FLIES CANNOT ENTER

Flies are, generally speaking, the most dangerous creatures to enter our homes and every care should be taken to see that they do not contaminate our food with dirt and disease germs. Particularly in hot weather food should be kept covered, perhaps in such a meat safe as is illustrated here.

hour or two the oxygen supply in the room gets too low for comfort or health

A house should be orderly, quiet and cheerful. Loud noises really hurt many people. Nerves need rest as well as bones and muscles, brains and stomachs. In cities, tramcars and railway trains, factory whistles and carts and noisy crowds are always hammering on people's nerves. Homes are the places to rest nerves. So don't slam doors or scrape your chair legs on the floor, or throw your shoes across the room, or shout to someone upstairs. You may yell on a farm, or at a football game where everyone is yelling. Very good people often quarrel and cry about little things, because their nerves are tormented all the time. Watch these danger signals. Sick nerves take a long time to cure.

Finally, don't take all your troubles into the house to talk over. Laugh and grow fat, and sue the doctor's bills. Bring all the cheerful things, the pleasant things, the funny things you come across, into the house. No family is as healthy as it might be unless it is happy.

Hygiene deals with the causes and prevention of disease in their relation to the preservation of health. In this sense hygiene has well been named preventive medicine, since it seeks to anticipate the work of the physician by its endeavour to remove the causes of disease.

The advance of medical science—especially the progress which has been made in microscopic research into the causes of disease—together with the spread of education has tended powerfully to awaken national endeavour in matters both of personal and public hygiene. Offices of Health have been established everywhere. One of the most important phases of their work is represented by the law which makes compulsory the notification to the authorities of every case of certain diseases which falls under the notice of the householder or medical attendant or both. Another is the regular medical and dental inspection of school children by qualified doctors of both sexes.

The authorities, being early informed of the appearance of any cases of such disease, can take prompt measures for their isolation and their removal, if need be, to hospital. The sea-ports, too, are now narrowly watched by their special health officers, and suspicious cases of illness on vessels arriving in harbour are at once dealt with. In this way the importation into this country of plague, cholera and other tropical diseases has been prevented.

In the domain of industrial hygiene great strides have also been made. Formerly, the dust and foul air of factories were responsible for a great number of serious diseases, but the measures taken by the authorities have been highly successful, and comparatively few instances of diseases of this nature are now recorded. Similarly, cases of lead and other poisoning in factories have also been greatly reduced. For this



LINING UP TO SEE THE DENTIST

Gone are the days when a visit to the dentist was put off until the pain from an aching tooth became unendurable. Nowadays most of our schools have teeth inspection at regular intervals, and the dentist comes to pay you a visit instead of the other way round. This photograph shows a 'travelling dentist' sent out by the West Sussex County Council Education Committee to those villages where there are no facilities for dental treatment.

care on the part of the authorities the whole community has reason to be thankful

Within the sphere of the health of the home, science has of late years made great progress. The principle of safe and sanitary drainage, whereby a house can be tripped off efficiently from the public sewers and the inroads of sewer gas prevented, is practised everywhere. Questions of ventilation and of lighting are being studied, and the warming of houses is no longer left to chance. Personal health, which ranges from questions of food and drink to those of cleanliness and clothes, is not neglected amid the general improvement in hygienic education.

Hygrometer. One of the important factors which the Meteorological Office must take into account in making its forecasts is humidity—*i.e.*, the amount of moisture in the atmosphere. To measure this, various instruments are used, called "hygrometers." One of the simplest is the toy known as the "weather house," at the door of which a man appears if the weather is about to be wet, and a woman if it is to be fine. It is operated by catgut threads, which grow shorter as the humidity increases and lengthen as it decreases, thus moving the figures. Hair also contracts when moist, and is used in the hair hygrometer, moving a needle on a scale as it changes in length with the humidity.

The wet- and dry-bulb hygrometer, also called the "psychrometer," is the most generally used. In the "sling psychrometer" type two thermometers are fastened side by side on a stand, exactly alike except that the bulb of one is covered with wet muslin. The thermometers are then whirled or fanned, and the evaporation of the moisture in the muslin causes a fall in temperature in the wet-bulb thermometer—rapid if the day is dry, and slight if it is damp. The dry thermometer records the actual temperature of the air, and by comparing the two readings the humidity can be determined from a set of prepared tables.

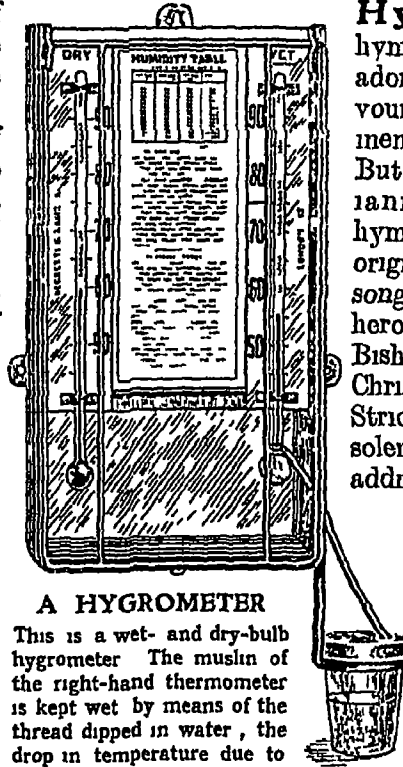
Another type is the dew-point or condensing hygrometer. This makes use of ether, which evaporates very quickly and soon cools one of the thermometers down to the point at which the moisture in the air begins to condense as dew. From the dew-point and the temperature of the air as given by the other thermometer, the relative humidity can be determined.

In chemical hygrometers the moisture contained in a given volume of air is absorbed by

some such substance as calcium chloride or sulphuric acid, and the increase in weight gives the amount of moisture.

Hygrometers are used in many modern schools and office buildings to measure humidity so that moisture can be thrown into the air when it becomes too dry.

Hygrometers are also used in industries in which humidity is an exceedingly important factor, such as the manufacture of textiles, cigars, and paper. By using hygrometers the amount of moisture present in the factory can be regulated to a nicety, and thus the work can proceed under ideal conditions.



A HYGROMETER

This is a wet- and dry-bulb hygrometer. The muslin of the right-hand thermometer is kept wet by means of the thread dipped in water; the drop in temperature due to evaporation measures the humidity of the atmosphere.

Courtesy Agostini & Zambra

Hymns. The singing of hymns that express feelings of adoration, praise or religious fervour has always occupied a prominent place in Christian worship. But hymns are older than Christianity. The Greeks had their hymns, and the word hymn is originally Greek, meaning a festive song or ode in praise of gods or heroes. It is said that Hilary, Bishop of Arles, composed the first Christian hymn about A.D. 431. Strictly speaking, a hymn is a solemn song of praise or triumph addressed to God. A versification of the Psalms of David is called a psalm, and that of other parts of Scripture, a paraphrase.

The popularity of hymns arises from the fact that they furnish a religious congregation with the opportunity of taking an active part in the service, instead of being

merely listeners to a preacher.

As early as 633 the use of hymns was sanctioned in churches, and since that time religious poets and versifiers have been pouring out a stream of hymns, some of which have gained world-wide popularity. In our church hymnals today there are translations from Latin and Greek hymns of the early Christian Church. Other hymns, again, in common use are from the German, as for example "Now thank we all our God." Luther did much to promote the use of hymns in the German Protestant Church. Amongst the great English hymn writers a foremost place must be given to Charles and John Wesley, Isaac Watts and William Cowper. John Henry Newman must be included, too, if only because of his poem, "Lead, Kindly Light." English hymns have been translated into every language, and are sung by Christian converts of all nationalities from one end of the world to the other. Perhaps the



THE VILLAGE CHOIR SINGS A HYMN

Church choirs have not always sat in the chancel or been dressed in cassocks and surplices, indeed they often occupied the gallery at the back of the church, like the motley collection of singers and instrumentalists in this painting by Thomas Webster in the Victoria and Albert Museum. The players took the place of the organ, when organs were too expensive for a village church. But then, as now, the singing of hymns was the most popular part of the service.

most popular hymns in the language are "Onward, Christian Soldiers," "Abide with Me," "Rock of Ages," "Nearer, my God, to Thee," and "Jesu, lover of my soul", while one of the first hymns little children learn to sing is that sweet melody, "There's a Friend for Little Children."

The story of the origin of some of our most popular hymns is in many instances very interesting. Who would ever have thought that the Rev S Baring Gould's "Onward, Christian Soldiers," composed as it was for a Yorkshire Sunday School procession, would emerge from obscurity and become one of the most popular hymns in the whole world?

The beautiful hymn "Abide with Me" was written by the Rev Henry Francis Lyte, a clergyman at Brixham, Devonshire, in 1847, two months before his death, and no doubt it was the consciousness of his failing health that inspired the beautiful words—

Swift to its close ebbs out life's little day

This faithful minister had preached his last sermon in his beloved church, had said farewell to his flock of hardy fishermen who loved him like a father, and had returned home to muse on the past and the future. And as he sat and contemplated the nearness of his end, the inspiration of "Abide with Me" came to him in a moment. He wrote the words down and gave them into the care of his wife, and when the news of his death came to Brixham a few weeks later the hymn was brought out and his parishioners sang it for the first time in the parish church.

It is said that the first verse of "Our Blest Redeemer, ere He breath'd," came to the composer, Harriet Auber, when she was musing by her window in a house at Hoddesdon,

Hertfordshire. Asshe had no pen or paper handy, she scratched the words on the window-pane with the diamond in her ring. There the words remained for years after the hymn had become widely known all over the world.

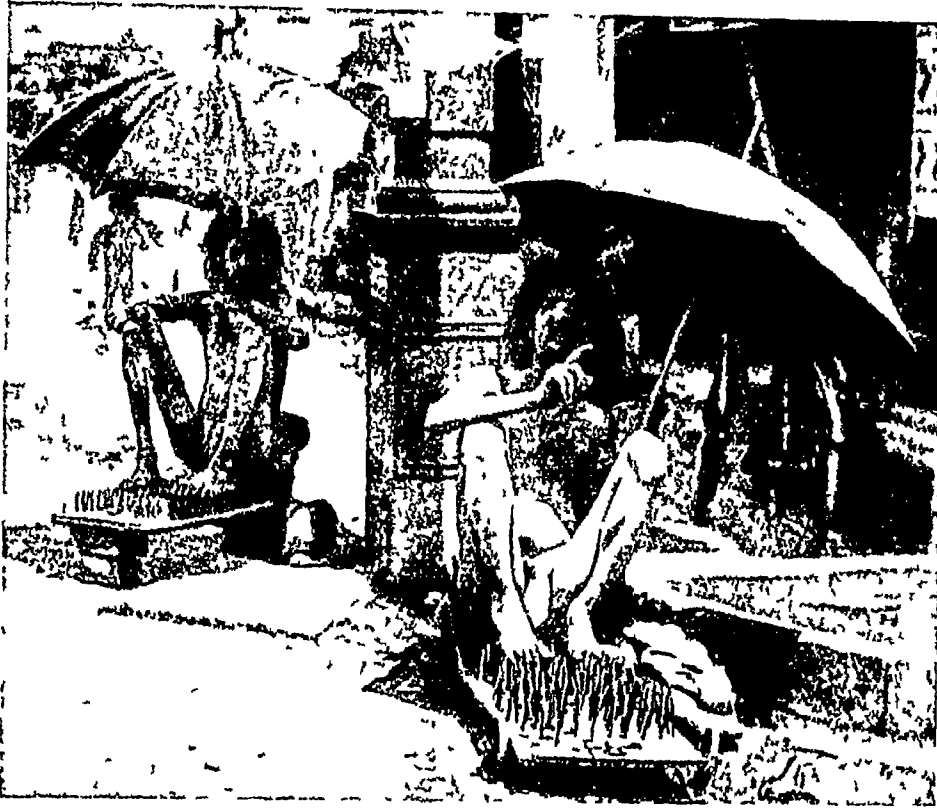
Another famous hymn written in peculiar circumstances was "Lead, Kindly Light." This was composed by J H Newman, then an Anglican priest, when becalmed in an orange boat in the Mediterranean in 1833.

Hypnotism. Many strange occurrences which were once looked on as miraculous, magical, or delusional have been explained by modern science as the results of that little-understood mental condition known as "hypnosis," or hypnotism. This condition resembles normal sleep, except that the hypnotized subject may retain some of his active faculties such as the power to walk, talk and understand what is said to him. At the command of the operator the patient will lose all sensation in a leg or an arm, so that a pin can be thrust into either without pain. The heartbeat



THE 'ROCK OF AGES'

Few people know of the interesting origin of the famous hymn, "Rock of ages, cleft for me." It was written by Rev Augustus Toplady (1740-1778) while he was taking shelter from a storm in this cleft at Burrington Combe, Somerset.



SELF-HYPNOTIZED HOLY MEN OF INDIA

To attain holiness, the fanatical Hindu devotees will often resort to extreme methods. These two fakirs sitting on boards of sharp spikes during the Durga Puja Festival at Calcutta have developed their immunity to pain by constant imposition of will-power over their bodies, i.e. by self-hypnosis. Their expressions betray no discomfort, and they can sit like this for days together.

can be made slower or faster, a rise in temperature and perspiration can be induced and there are records of cases where drops of blood have been made to ooze through the skin. The hypnotized person will perform ridiculous actions, or carry out feats of skill and strength impossible to him under normal conditions.

In light hypnosis a person may remember the facts of his normal life and may recall when he "wakes up" what he said and did while hypnotized, but deep hypnosis produces a complete loss of memory in both respects, unless the operator orders the patient to remember something. Perhaps the most useful feature of hypnosis is found in what are called "post-hypnotic suggestions." These are suggestions made to the patient while hypnotized and which he will carry out afterwards. For instance, if the operator tells him that, when he awakens, he must take off his coat as soon as someone coughs four times the patient will do so, without being conscious of the reason for the action. It is this effect of hypnosis which is used by certain medical specialists in breaking drug habits, in certain forms of nervous diseases and in chronic functional disorders.

To understand even the simplest facts of hypnosis, it is necessary to realize the close connexion between the mind and the body through the nervous system, which centres in

the brain. In sleep, the faculties of the conscious brain become dulled and lose connexion with the body and with each other. But it is possible to keep one or more of the faculties half awake, as in the case of the fireman who sleeps through any amount of ordinary noise but springs up at the faintest tinkle of the fire alarm. A similar condition is produced in hypnosis. All the conscious faculties are put to sleep, except the faculty to respond to suggestions of the hypnotist. The hypnotist's mind and will take the place of the patient's mind and will, and since most of the ideas which might lead the patient to refuse

a suggestion are asleep, the body, which remains active, will answer to his commands.

The methods used to produce hypnosis are usually simple. The patient is asked to fix his eyes on some object and to make his mind a "blank" as far as possible. The hypnotist says a few low soothing words, and may even stroke the head or pass his hands before the eyes. A condition resembling natural sleep sets in, except that the operator holds the patient's attention and prevents complete slumber. Contrary to popular belief, it is almost impossible to hypnotize a normal person against his will, or cause him to do acts which are contrary to his deep-seated principles.

Hypnotism has been practised for centuries by the devotees of various religious cults in Asia and Africa. Self-hypnosis is doubtless often the explanation of the ability of Hindu fakirs and Moslem dervishes to submit to processes which normally would cause excruciating pain.

When hypnotism first began to be studied it was called "animal magnetism," or "mesmerism," after Dr F. A. Mesmer of Vienna, who used it to heal certain nervous ailments in the late 18th century. It remained a great mystery, however, and was generally associated with superstition and fraud, until modern psychology gave it a firm basis in science.



English became i. The 'i' sounds (long and short) are the most frequent vowel sounds in English, though the letter E occurs more often

THE ninth letter of the alphabet is one of the simplest of the letters in form but it was not always so. Among the Egyptians it was represented by two parallel lines \parallel and the scribes wrote it like this y . The Phoenicians gave it the form z and called it *Yod*. As written by the Hebrews (i) *Yod* was such a little insignificant letter that its name came to be used for the smallest part the least bit of anything (our word "jot"). Thus Christ is quoted as saying "Till heaven and earth pass one jot or one tittle shall in no wise pass from the law till all be fulfilled" (Matthew v. 18). The Greek word for the letter I (*Iota*) is used in the same way. Among the Greeks *Iota* was first written as a zigzag mark resembling a thunderbolt, but it finally straightened up into the upright I which the Romans adopted. The old letter *Yod* had originally been a consonant with a sound like that of our *y*. In Latin it was used sometimes as a vowel and sometimes as a consonant. As a vowel, its name and its long sound originally rhymed with *bee* and it was not until the end of the 16th century that its long sound in

Ibex. (Pron *i'-beks*) The homeland of this wild goat, *Capra ibex*, is among the most precipitous and inaccessible heights of the Alps, Pyrenees, Caucasus, and Himalaya mountains. It lives habitually above the line of perpetual snow, only descending to graze at night.

The splendid horns of the male, 30 to 60 inches long, rise from the crest of the skull in a long, graceful, backward sweep, and are marked on the front with bold cross ridges. The forelegs are shorter than the hind legs, making it easier for the animal to go up a slope than down. The hair is reddish grey, and longer in winter than at other times.

Ibexes feed in small herds, but the older males usually live alone and at higher levels than the females and the young. The Alpine ibex, *Capra ibex*, is now rare and is protected by law, it is separated only by slight differences from the African and Pyrenean species.

Ibsen, HENRIK (1828-1906) This great Norwegian poet and dramatist is remembered as a stern, lonely figure searching into the souls of Mankind and into the problems of society, and finding more evil than good in the world about him, though had he achieved success earlier in life, his work would probably have been of a different character.

Born at Skien, southern Norway, he was, because of poverty, apprenticed to an apothecary at Grimstad when still a boy, and suffered seven years of drudgery at his tasteless task. At the age of nineteen when he began to write poetry, he appeared to his unsympathetic townsmen as "a gloomy and sinister youth." Unhappiness spurred him to effort

that at twenty two he had prepared himself for entrance to the University of Christiania (now Oslo) and had written a tragedy in blank verse. Unable to remain in college long enough to graduate, he did poorly paid newspaper work, managed a small theatre, studied scenic art in journeys to Denmark and Germany, and wrote lyrics and unsuccessful plays for a dozen years.

The most original of modern dramatists, Ibsen was long in discovering his true bent, and he waited still longer for recognition to lift him above want. His "Warriors of Helgeland," which marked an epoch in Norwegian literature, and "Love's Comedy," the first of the social satires for which he is particularly famous, were coldly received at first. In bitterness of spirit, Ibsen left Norway. Two years later, in 1866, he sent back from Rome his splendid poetic drama, "Brand," and aroused his native country to tardy acknowledgment of his genius.



MOUNTAIN IBEXES IN A BATTLE OF HORNS

The ibex, a sort of goat, is one of the most handsome members of its tribe for its horns are, as you see here, long and gracefully curved. These two individuals, inhabitants of the London Zoo, have got their horns neatly interlocked and in this way they may struggle for hours to upset each other.

The Norwegian Parliament granted him a pension and asked him to come home, but until 1892 he chose to live abroad.

Success won, he devoted himself to writing satiric comedies of modern social life. Setting himself seriously to work to diagnose the ills of society, he abandoned verse and wrote crisp dialogue in everyday language. Misfortune had developed in him a biting irony, and his plays were so audacious, pessimistic and scornful of social hypocrisy that they could not be ignored. He challenged heated discussion and was denounced as "immoral." Ibsen's only reply was sarcasm and defiance. His own opinion he put in the mouth of his characters: "A minority may be right, a majority is always wrong."

His recognition was greater abroad than in his native land. By some he was held to pose as a moral teacher, like Tolstoy, but this Ibsen himself denied. He was simply



HENRIK IBSEN AND A SCENE FROM ONE OF HIS PLAYS

This painting is of a scene from Ibsen's saga-drama, "The Pretenders," written in 1864. The plot concerns Earl Skule, a man born to doubt, who disputes the throne of Norway with the rightful monarch, Hakon Hakonsson. Skule sets up a kingship, surrounding himself with regal pomp (shown here), but inevitably falls. Above, right, is a portrait taken in old age of Henrik Ibsen himself, the great Norwegian dramatist who, in his own way, did as much for the drama of the world as Euripides or Shakespeare.

a commentator, prescribing no remedies for social evils, and in time it was recognized that his chief claim to distinction was as a playwright. He scorned the "happy ending," and restored to the sentimentalized drama something of Greek simplicity and logic. His plots are masterly, his dramatic sense unerring.

Ibsen's plays have been translated into all European languages, and performed in many lands. Heddat Christiana (Oslo), May 23, 1906.

The Norwegian setting of Ibsen's plays was probably in great measure responsible for the tardy recognition of their merits. The characters seemed unreal, mainly because they moved in unfamiliar surroundings. It remained for the pens of such writers as George Bernard Shaw and William Archer to point out that these apparently exotic figures were world types.

To English readers and playgoers Ibsen's best known works are "Brand" (1866), "Peer Gynt" (1867), "The Pillars of Society" (1877), "A Doll's House," (1879), "Ghosts" (1881), "Hedda Gabler" (1890), and "Little Eyolf" (1894).

Icarus. The tale of this young man is certainly one of the earliest of all those tales of which the moral is the tragic end that awaits inordinate ambition. For Icarus was the

NYMPHS LAMENT FOR THE FALLEN ICARUS



In this lovely painting by Herbert J. Draper, sea-nymphs are bewailing the fate of Icarus, the son of the legendary Greek sculptor and engineer Daedalus. The latter employed by Minos, the king of Crete, to build the labyrinth in which to imprison the monstrous Minotaur, was placed in it himself, and invented pairs of wings on which he and his son could escape. But poor Icarus flew too near the sun, and, the wax that held together his wings melting, fell headlong into the Aegean Sea.

Tate Gallery London

son of the famous Greek, Daedalus, and with his father, he was flying away from the great king Minos, who had imprisoned them. Their wings, the invention of Daedalus, were of feathers, fastened to their shoulders with wax. Daedalus flew safely along, but his son, ambitious to go higher, went so high that he came too near the sun. The wax which secured his wings was melted and the youth dropped to his death in that part of the Aegean Sea which has ever since borne his name, the Icarian Sea. (See the article on Daedalus)

Ice. When water is sufficiently cooled it becomes filled with a multitude of six-sided needle-like crystals, which increase and interlace until the whole mass becomes solid ice. In water which freezes naturally this change to a solid state begins at the surface and spreads gradually inwards. When the freezing process is complete the crystals are so closely packed that they cannot be separately discerned.

Fresh water normally freezes at 32° Fahrenheit or 0° Centigrade at atmospheric pressure, salt water at a lower temperature. But if oil is poured over water in a vessel, and the vessel is kept absolutely still, the water may be cooled to 10° Fahrenheit without freezing. If the vessel is slightly shaken or jarred, however, the water solidifies at once. Most substances contract as they freeze, but this is not true of water. Water expands upon freezing by one-eleventh of its own bulk, its point of greatest density being 4° C, above and below which the expansion takes place. (See Freezing, Refrigeration)



WHERE THE ICE AGE LEFT ITS MARK

When, during the Ice Age, the great sheets of ice swept down over the existing rock-surfaces they literally smoothed them down rounding off sharp parts and grinding projections flat. Small, rounded rock-surfaces like those seen in this photograph are relics of that time, and, from their resemblance to the backs of a flock of sheep, are called from the French for "rocks" and "sheep" "roches moutonnées".

Ice Age. Many thousands of years ago, when the mammoth and the mastodon still roamed the trackless forests, vast ice sheets formed over the northern part of the world. The ice was so deep that only the highest mountain peaks were visible above it. The ice sheets were formed from the snow which fell in great quantities when the climate was not warm enough to melt it.

In North America the ice reached great thickness, especially in Labrador, near the western shore of Hudson Bay and in the mountains of British Columbia. In Europe the ice was at least 6,000 feet deep over Norway. Scotland, Ireland and all but the southern part of England were covered by a thick layer of ice which was continuous across the North Sea with the Scandinavian ice-cap. Much of Germany and Russia were buried beneath great thicknesses of ice.

The glacial period, or Ice Age, consisted of several glacial epochs, separated by interglacial epochs of milder climate, during which the ice sheets were reduced or perhaps disappeared altogether. The last glacial epoch ended some 25,000 years ago, as nearly as is now known. The first glacial epoch of the period was perhaps forty or fifty times as long ago. The melting of the ice produced quantities of water, which gathered into lakes wherever basins were present.

The melting of the last ice sheet left a thick deposit of debris, called "drift," on the surface which it had covered. The drift consisted of rocky and earthy debris which the ice had scraped and broken off from the land over which it passed.

The irregular distribution of the drift, as well as the erosion of the ice, left many depressions without outlets in the surface, and in these depressions ponds and lakes were formed.

Indeed, the ice sheets made great changes in the physical features of the regions they covered. In addition to the lakes, they left the surface strewn with boulders of various kinds of rock, many of them of great size. Some of them had been transported hundreds of miles from the places where the ice broke them from the bed-rock. Some of the lakes occupy basins made by the damming of river valleys by drift which the ice left. By means of these boulders, and of the smoothing off and scratching of the rocks over which the ice sheets passed, the extent



ICE AGE LANDSCAPE IN NORTHERN FRANCE

During the Ice Age, it was, as you would expect, intensely cold and those animals which managed to survive did so usually because they were endowed with a thick and woolly coat. Here is a typical scene in the flat steppe country of Northern France during one of these periods. The great creatures in the foreground are woolly rhinoceroses one of which appears to have sunk, perhaps for ever into a snow-drift. In the distance are saiga antelope and a small herd of mammoths.

American Museum of Natural History

of the sheets and the direction in which they moved can be worked out quite accurately.

The many waterfalls within the area covered by the ice, both in the east and west, are in most cases due to changes of drainage caused by the great glacier, for many of the earlier valleys were filled by the deposits made by the ice, and when it melted the surface waters sought new courses. In the glaciated area there are many peat beds, formed in marshes which developed in shallow basins in the surface after the ice sheet melted.

The ice, which encroached gradually on regions previously warm, must have submitted all living things to new and disturbing conditions. In consequence, some animals became extinct at this time, others moving southward. Man existed in Europe during the early interglacial epochs, but there is yet no evidence that he existed in America until after the Ice Age.

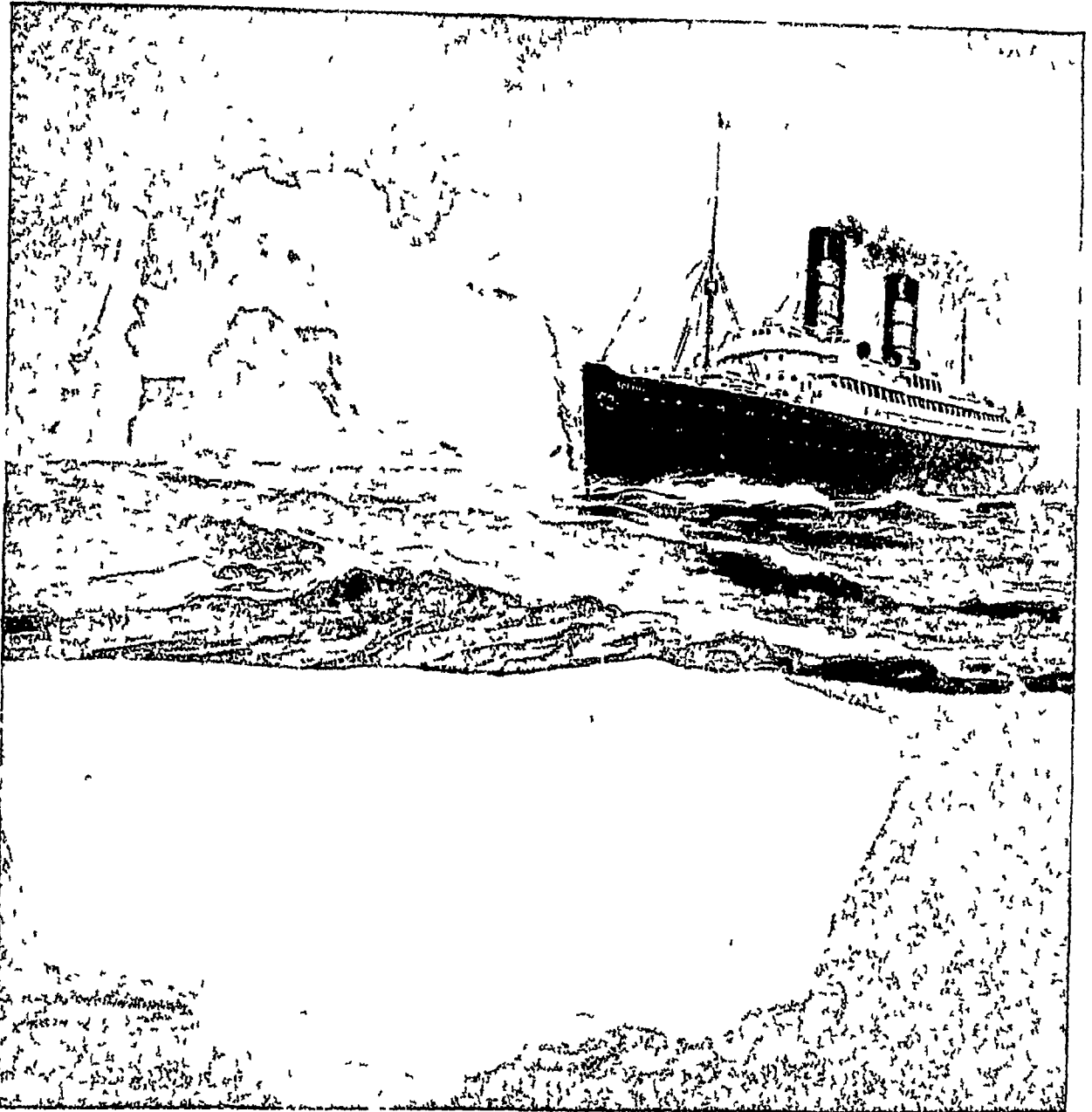
The cause of the development of these prodigious ice sheets is not known with certainty. Some scientists believed that it was due to the temporary elevation of those parts of the earth where the ice gathered, but this view does not find much support in fact. Others have attributed the Ice Age to astronomical causes. This explanation also seems untenable, in the light of known facts. At present, the most probable hypothesis is that great changes in climate are the result of changes in the constitution of the atmosphere. If, for example, the amount of carbon dioxide in the air were to be increased, the temperature of the earth would rise, if decreased, the temperature would become colder. Rational explanations of variations in the amount of carbon dioxide can be suggested. (See the articles on Geology and Glacier)

Icebergs. Shortly before midnight on April 14, 1912, in the waters of the Atlantic about 1,600 miles north-east of New York, there occurred one of the greatest marine disasters in all history. The giant British steamship Titanic—the largest vessel then afloat—was making her maiden trip from Southampton to New York, when she suddenly struck the underwater shelf of an iceberg. Two hours later the ship sank, sucking down all but 706 of her 2,300 passengers and crew. In answer to frantic wireless calls the Cunard liner Carpathia at last reached the spot and picked up survivors from rafts and lifeboats. But the iceberg had done its deadly work.

Icebergs are at once the dread of sailors and the wonder of all who look upon them. They are the broken-off ends of glaciers that descend to the sea. They vary in size from tiny cake-like "growlers" to great masses a mile or more in diameter. Although some icebergs are as much as 200 feet above the water, we must remember that "their green roots sleep in the awful deep." Careful calculations show that only about a ninth of the weight of the ice is above the surface of the ocean.

These wanderers of the sea overwhelm the onlooker with their beauty. Over their dazzling surface of solid ice, tints of delicate green mingle with blazing sapphire veins, contrasting with the deep dove coloured caverns carved by the hungry waves, and, at dawn and sunset gleams of purple, azure and rose colour the scene. As they drift along, now and then breaking, turning, sloughing off great fragments with a tremendous crash, many of them assume fantastic shapes—like castles, triumphal arches or domed mosques.

ICEBERGS



THE GREAT WHITE PERIL OF THE OCEAN LANES

Many a great vessel, shaping her majestic course across the Atlantic, has been menaced by just such an iceberg as is shown in this picture towering above the speeding liner. From the picture one might suppose that the danger was past, but notice how small a proportion of the whole mass of ice is above the water. It is this that makes these floating islands so dangerous to passing vessels, and numbers of ships have been ripped open by an iceberg's underwater shelf and gone to the bottom with the loss of many valuable lives.

Once afloat, icebergs are soon melted by the warmer ocean water and the sun. Some bergs, however, are so huge that they travel 2,000 miles or more from their ice-cap home before wholly disappearing.

Most bergs in the North Atlantic come from Greenland's great ice-cap. Here in early spring a great procession of floating ice islands begins its journey southward, and somewhere about April, May or June they reach the northern Atlantic steamer routes. Here they come under the influence of the Gulf Stream flowing north-eastwards, their course southwards is stayed and they quickly melt. After the Titanic disaster a commission, on which the great

shipping concerns of all nations having North Atlantic interests were represented, decided upon a more southerly route between Europe and U.S.A. during the winter months, by which vessels would escape the dangers of icebergs.

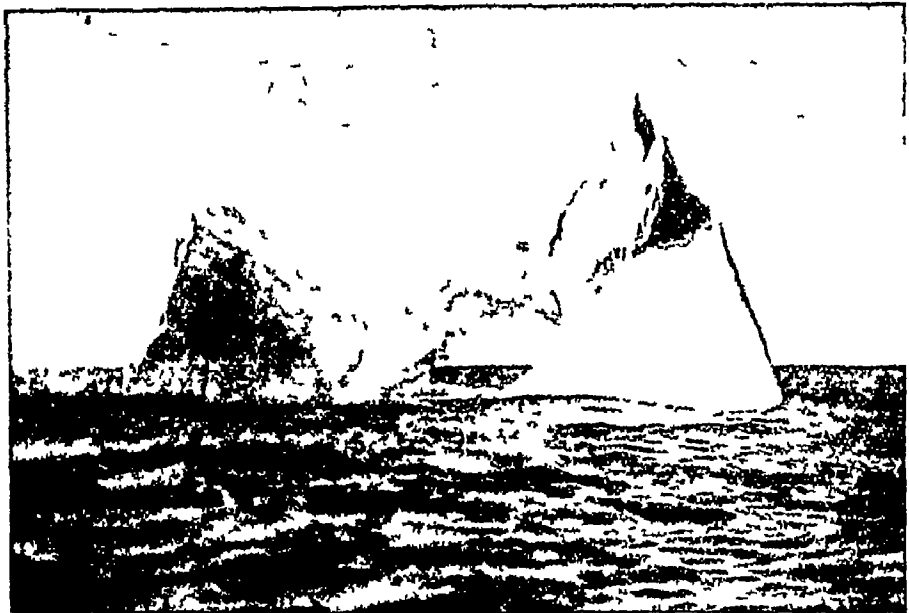
Two routes are particularly dangerous during the iceberg season: one through the Strait of Belle Isle into the Gulf of St. Lawrence, the other by way of the "Grand Banks." Sailors do their best to avoid the bergs by taking the more southerly and safer routes.

When night has fallen the icebergs glow with a peculiar white sheen called "ice blink," due to the reflection of scattered rays of light from the sky on the white surface of the ice.

It has often been observed that the presence of birds far from land, or the absence of waves, means that floating ice is near, as does the sudden echo from a whistle or a horn. On foggy days bergs may loom up darkly against the white shadowless fog particles. Since 1912 vessels of the United States coastguard service have patrolled the danger zone during the iceberg season, broadcasting the position and probable course of all icebergs observed.

No reliance whatsoever can be placed on ordinary measurements of either air or water temperature as a means of detecting the nearness of a berg, but a micro thermometer for recording one ten-thousandth of a degree has been of some value in this connexion.

Ice Hockey. Ice hockey, which bears little similarity to field hockey, has been played in Canada and other countries for many years. It has now gained extraordinary popularity in England, where it has become a strenuous sport for the few and a thrilling



SLOWLY MELTING MOUNTAINS OF FLOATING ICE

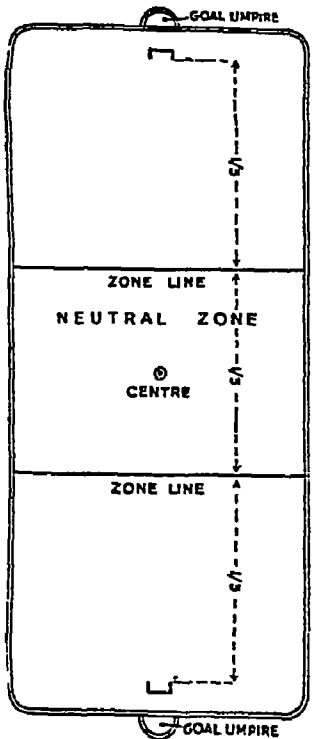
Gigantic icebergs like this one break off the Arctic ice sheet at the edges of Greenland's glaciers and float many miles sometimes into warm seas. Here the waves and the heat of the sun melt the ice, forming fantastic pinnacles and arches like those that decorate the strangely-shaped berg seen in the photograph reproduced above.

Courtesy of U.S. Coast Guard

spectacle for the many. The big amateur teams play one another in League and other matches on huge artificial indoor rinks.

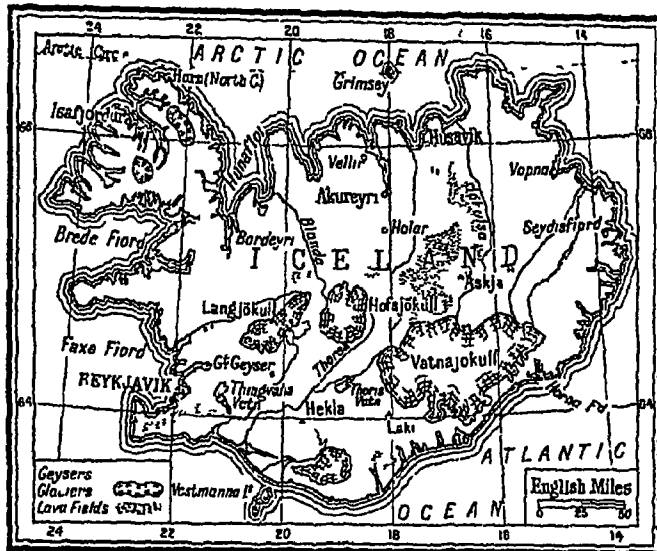
The size of the rink on which "the world's fastest game" is played varies, although the ideal is about 185 feet by 85 feet. The goal is very small—only six feet in width.

Ice hockey skates resemble those worn for speed skating, but have shorter blades. The total length of the stick used, which has the blade set at a considerable angle to the handle,



ICE HOCKEY THE WORLD'S FASTEST GAME

The goal minder of the Harringay Racers saves for his side and up the ice with the puck skates one of his team mates, while the Earls Court Rangers prepare to intercept him. No wonder with exciting incidents like this happening every minute, that the 'fans' come in their thousands to watch ice hockey. On the right is the rink as marked out for the game.



THE SOVEREIGN STATE OF ICELAND

must not exceed 69 inches. Instead of a ball, a round and flat rubber disk, called a puck, is used. This is three inches in diameter, one inch thick, and weighs between five and six ounces. It will be readily understood that both the ring-side spectators as well as the players must be adequately protected against the flying puck—not to mention flying bodies, skates and sticks. Ordinary skating skill is of little use for this game which depends on speed over short distances, and such tremendous control to enable the player to stop, turn and start again almost in one movement. The actual skating and playing of the puck are almost automatic.

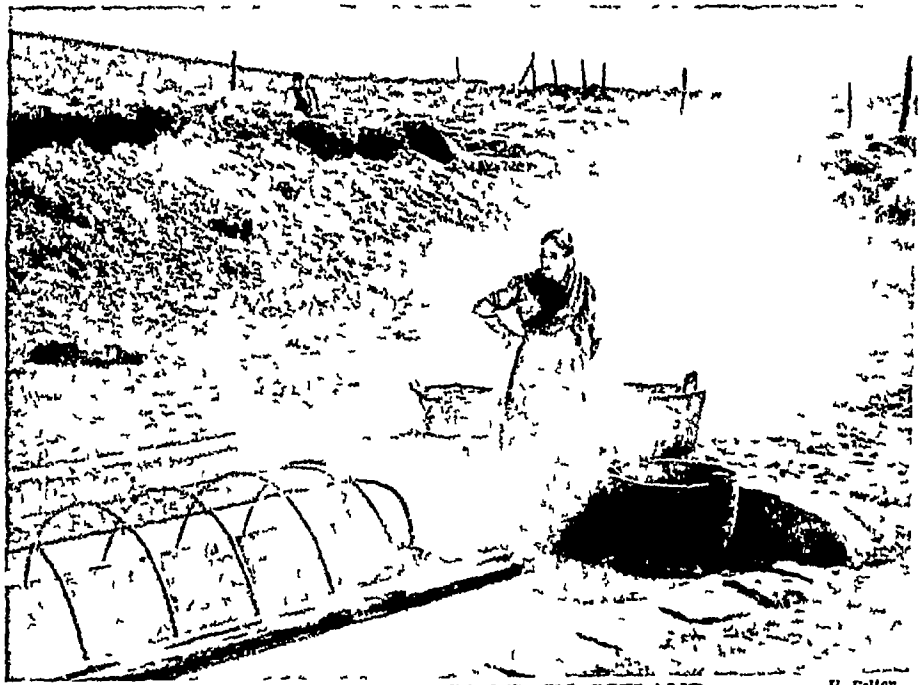
A team is composed of six players—a goal-minder (a heavily-padded individual), two defence men and three forwards. Two men may be kept in reserve as substitutes. Players are penalized by being sent off the ice for a certain length of time. The play consists of three periods of twenty minutes each.

Iceland. As a little shipload of Norse colonists neared the unknown shores of Iceland in A.D. 874, their hearts beat fast with wonder and joy at sight of the Arctic sun glittering on snow-clad domes, towering

cliffs, naked volcanoes and ice-bound waterfalls and streams.

Today, the descendants of those Norseman, and of the Irish and others who followed them in the next fifty years, are still to be found in this "island of ice and fire," washed eternally by the Atlantic and the cold blue Arctic Ocean. Iceland lies 150 miles east of Greenland and 500 miles north of Scotland, and has an area of 39,700 square miles, but only about six per cent of it is under cultivation.

The Icelanders today are as plucky as their ancestors of old. They live in towns and scattered farms along the foggy coasts and the damp, sheltered valleys of the fiord-indented lowlands around the coast, the centre of the country being a huge rugged tableland, a region of lava deserts, sand wastes, giant glaciers and mammoth waterfalls—larger than any in Europe. In this weird hinterland are boiling mud springs and geysers which hurl torrents of water high in the air, while more than a hundred great volcanoes tower in the background, many ice-clad when quiescent. From these have come stupendous eruptions and earthquakes, wiping out great tracts of cultivated land and often taking a terrible toll of lives. The Iceman shudders when he thinks of Mt. Laki's activity in 1783, which destroyed four-fifths of Iceland's livestock, devastated much of the land, and, together with the resulting famines and epidemics, killed over one-fifth of the population.



WELLS OF HOT WATER IN ICELAND

H. Felton

We think of Iceland as a cold country and we should expect the springs to be frozen, and not hot like the Laug at Reykjavik, seen above. This spring is used in much the same way as we use our hot-water taps, for doing the washing and making the tea, but the lucky Iceman does not have the trouble of stoking dirty boilers with expensive coal.

Although the surrounding oceans make Iceland warmer than its latitude (63° 12' to 66° 33' N) would suggest, the climate is nevertheless raw, cold, and variable—often snowy—the year round. And Iceland folk for the most part can earn their monotonous living only by tending small crops of hay, potatoes, and turnips, by watching over cattle, sheep, goats and the small hardy Iceland ponies that graze in scattered pastures, and by fishing in stormy seas for cod, halibut, herring and shark.

Sea harvesting gives the Icelander the greater part of his exports, his cod fisheries are among the most important in the world, attracting many foreign fishermen. Tallow, wool, hides and skins, sheep and horses, salted meat and eiderdown are other exports. The trade is chiefly with Denmark, Great Britain, Norway and Sweden. There are no railways but many motor-cars. The mineral wealth (which includes Iceland spar, a transparent variety of calcite used in making optical instruments) remains largely undeveloped.

Despite all handicaps the Icelanders are a sturdy, law-abiding and progressive people. Educational standards are high, and more books are printed and sold in proportion to the population than in any other European country. Iceland has had woman suffrage since 1915, and was the first country to introduce prohibition, which was in force from 1911 to 1935.

The glory of Iceland lies in its literature, which has a longer history than any other vernacular prose literature in Europe, with the single exception of English. In the long winter evenings the Icelanders have always loved to sit round the fire and tell stories about their kings and heroes. These stories, or sagas as they are called, were collected and written down by Snorri Sturluson (1179-1241) and by later writers, and so little has the Icelandic language changed in the course of centuries that the Icelanders of today can still read these old tales with but little difficulty.

Sagas of the Norsemen

For simplicity, directness and action the sagas have never been surpassed. In them we read how the old Norsemen or Vikings left their home country and came to settle in Iceland, how from Iceland they invaded and ravaged Scotland, Ireland and England and how they later settled in the Orkneys and Hebrides.

The Victorian poet William Morris translated many of the sagas, but perhaps the best known in English is "The Story of Burnt Njal," as translated by Sir George Dyce.

Another source of pride to Icelanders is that they have had some form of parliament for over



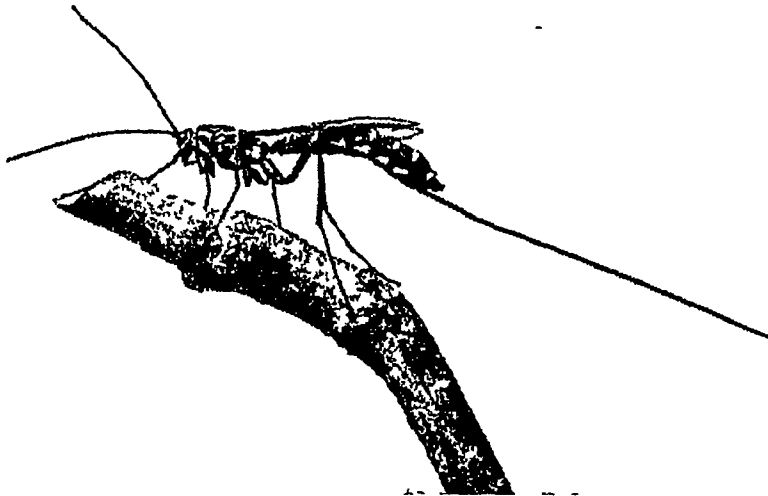
ICELAND'S GREATEST WATERFALL

In the courses of Iceland's rivers are many fine waterfalls, Skogafoss (seen here) being one of the most magnificent and, indeed one of the grandest sights of its kind in Europe. It plunges into a yawning abyss nearly 100 feet deep and at its base throws up dense clouds of spray in which rainbows can be seen.

a thousand years. About the year A.D. 930 a central moot or meeting, called the Althing, was called to settle disputes and uncertainty about the law.

Iceland's history begins with its settlement by Norse colonists in the 9th century, but in 1264 it was annexed to Norway, and later fell with Norway under Danish domination. In 1918 an Act of Union (expiring in 1940) made it an independent state, united with Denmark only through having the same sovereign. Its capital, Reykjavik, has a population of 32,000. The population of Iceland is about 113,000.

Ichneumon Flies. These beautiful insects with their four gauzy wings are not flies at all, but members of the order *Hymenoptera* to which belong the ants, bees, and wasps. They are invaluable allies to the farmer. They destroy the young or larvae of many harmful insects, such as the army-worm and the tussock moth, by laying eggs in their bodies. When the



ICHNEUMON ARMED WITH AN EGG-LAYING WEAPON

J J Ward

Strange indeed is the appearance of this ichneumon, which goes by the awesome scientific name of *Rhyssa persuasoria*. The individual you see here is a female, as you can tell by the long ovipositor, which is also a weapon for piercing the insect inside which the eggs will be laid. For all its fineness, this weapon bores through solid pine wood!

and spends most of its life in the water. It has slightly webbed feet and feeds on seaweed. The Galapagos land iguana is a stout, lazy creature, which feeds on the foliage of trees. The large common iguana of Central and South America is hunted by the natives for its white, delicate flesh, which is something like chicken. The rhinoceros iguana of San Domingo has two horns on its nose. Even more frightful in aspect is the helmeted or hooded basilisk found in Central America.

larva of the ichneumon fly hatches, it slowly eats its way into the other larva and thus kills it. If you rear caterpillars you may find one day a lot of little yellow cocoons all round the dead body of one of them—these are the ichneumon cocoons.

Idaho, U.S.A. Called the "Panhandle State" because of its shape, Idaho lies to the west of the Rocky Mountains, and its northernmost boundary touches Canada. Idaho is a Red Indian word meaning "Gem of the Mountain," an apt description in view of the glorious natural scenery of the state. It is 83,000 sq. miles in extent, and comprises a high tableland rising in places to peaks of over 12,000 ft. The products are mostly agricultural, but there are mines for gold, silver and other minerals.

Iguana. (Pron ig-wah'-na) This fantastic family of lizards, great and small, and varying widely in appearance, is found only in North and South America, except for two genera in Madagascar and one in the Fiji Islands. Their curious teeth, round at the root and saw-like at the tips, are the distinguishing characteristic. Typically, too, they have a large dewlap or pouch under the head and neck, and a scaly crest running down the back, from the neck to the end of the long slender tail. Most of them are green and live among trees, some have the power of changing their colours apparently at will.

The great sea iguana of the Galapagos Islands is 4 or 5 feet long or more,

Iliffe, EDWARD MAUGER ILIFFE, 1ST BARON (born 1877). The life-story of Lord Iliffe would embody a romance of modern journalism which began with the enterprise, foresight, and



Erving Galloway

A GIANT MARINE IGUANA

Although it is the largest member of its family—it is over five feet in length—this great marine lizard is harmless enough. It comes from the Galapagos Islands off the coast of Ecuador, a veritable home for weird creatures that exist nowhere else.

sagacity of his father, William Isaac Iliffe, more than half-a century ago. In the limited space that is available here we can only hint at the astonishing advance from the most modest beginnings in 1881, when W I Iliffe ventured into the unfamiliar world of technical journalism with a periodical which he called "The Cyclist," and which afterwards became "The Cycle Trade Review," and still later "The Motor Cycle and Cycle Trader," under which title it still flourishes.

Coventry, the home of the cycle trade, was naturally the home of its first representative journal. The "Bicycling News" was another successful journal founded by Iliffe, and it had the distinction of employing on its staff a brilliant young man named Alfred Harmsworth, who later became Lord Northcliffe.

The element of fortune enters with the coming of the motor car, for though Iliffe had foreseen the tremendous expansion of cycling, he could not have foreseen the invention of the internal combustion engine some years later.

But he was alert and readily did for the motor car what he had so successfully done for the bicycle. "The Autocar," which has held the chief position in motoring journalism for 42 years, is still the leading journal of the Associated Iliffe Press. America, the greatest motor-producing country in the world, has no similar publication of comparable value or importance. A bare description of the other journals that have grown up around "The Autocar," or have become associated with it, would fill a page of our book, covering as they do many trades and industries, including agriculture, electricity, photography, nursing, yachting, etc. And it was the characteristic energy and enterprise of Edward Iliffe and his brother, W Coker Iliffe, that, after their father's death, carried the business to heights of success which its founder could hardly have dreamt of.

Edward Iliffe's organizing abilities were nationally recognized when he was appointed controller of machine tools in the Ministry of Munitions during the World War, for which service he was knighted in 1922. The following year he was elected M P for Tamworth, and retained the seat until 1929. After the World War he was associated with William and Gomer Berry, afterwards Lord Camrose (qv) and Lord Kemsley (qv), in many important journalistic enterprises. He was raised to the peerage as Baron Iliffe of Yattendon in 1933.

Illinois, U S A (Pron il-i noi') This State has grown in less than three centuries from an undeveloped region, containing a few French trading settlements, to a leading industrial area of the central U S A. There are miles upon miles of level, fertile prairie, with the Mississippi on the western boundary and Chicago, the

State's great metropolis and commercial outlet on Lake Michigan, on the north east. Other towns are Peoria and Springfield (pop., 71,300), the capital and burial place of Abraham Lincoln. The area of Illinois is 56,600 sq miles, and the population 7,630,000.

Imagination. It is pleasant to lie on the grass on a warm spring day and gaze up at the clouds, seeing in them first a face, then an animal, then another object and another. In these reveries we are duplicating one of the famous experiments carried on in the psychological laboratory. There the person taking the test must look not at clouds but at ink blots and write down, within a given time, as many as possible of the things he sees. It is imagination which enables one to see such things.

Thinking, when it concerns itself with objects or events outside our personal experience, is imagination. Sometimes imagination is defined as the making of new combinations of old experiences. I remember the horse which I saw yesterday and also the man. But if I put the horse and the man together and think of a mysterious creature with the body of a horse and the head of a man, I am imagining. Even the writer of the most fantastic tales puts elements of past experience into his characters.

Imagining and Inventing

Imagination plays an important part in the kind of thinking which solves a practical problem. The fancies which enable an Edison to give the world electric lighting represent imagination brought under control and made to work to a useful end. If we are puzzled about where to get the wheels needed to make a scooter and suddenly think of taking them off an old roller skate, we are using this imagination.

In almost any line of endeavour, imagination of the kind which gets results is necessary. It is made up of two things: first, the ability to think of new combinations of experiences; second, the ability to select those combinations which are best. The person who has only the first of these is a muddler and a failure. The person who can criticize but cannot strike out on new ideas is equally handicapped. Modern scientific method has added a third requisite to these two—experiment or test to answer the practical question, "Will it work?"

In science, discovery, and invention, in art and literature and business, these three processes are at work—imagination, criticism, and experiment or test. All progress, past and future, depends on Man's ability to perform this threefold task, and to profit by relating them to the work at hand.

Impressionism. Can you imagine paintings of such novelty and originality, in subject and technique, that no one who admired them was thought sane, while the whole world

IMPRESSIONISM

of art was divided into two camps over their quality? Yet that is what happened when the first exhibitions of Impressionist paintings were held in England early in the present century. Some of these paintings, too, were already forty or so years old, for the movement which came eventually to be called Impressionism began in France in 1863.

In that year the dissatisfaction of a large number of artists with their treatment by the authorities controlling the Salon—the French equivalent of our Royal Academy—led to what amounted to an open revolt. The dissatisfied painters set up on their own, striving to make themselves as independent as could be from the tyranny of the academic painters of Paris. Then the emperor, Napoleon III, opened the *Salon des Refusés*, for the exhibition of works by those men whose pictures had been thrown out by the Salon proper. (See France, Art)

Aims of the Impressionists

These Impressionists, as they at once came to be called, were not an organized body but included painters of all types, whose principal common bond was revolt. They got their name from the fact that they sought to reproduce in pictures the fleeting moods of Nature, the exact effect in one single moment, rather than the more permanent, static, conventional affects favoured by the academic painters. The Impressionist painter, in fact, showed things as

they looked when he saw them, not as they might really be. Thus, where before there had been, perhaps, a convention that all trees are green and must therefore be painted green, while shadows are grey or black, and must therefore be painted grey or black, the Impressionist departed from this convention. As we all know, on a hot summer day the trees may seem golden with reflected sun, the shadows brilliant blue with shimmering heat, and this is just how the Impressionist tried to paint them, whereas in the old tradition they would still have been green or black.

Put in another way, we see that the Impressionists were not concerned really with the colour of an object so much as with the play of light on it, for they realized that colour in itself is nothing concrete separate from light. Therefore, they gave range to their colours, but, however, used none other than the colours which occur in the spectrum. They would build up a compound colour, e.g., green, by painting with its components, yellow and blue.

At the same time the Impressionists were carrying on another battle, that against the standards of "beauty" imposed on the art world by the same academic tyrants already referred to. They saw that there might be beauty in anything, from a mud flat to a mountain, and that it was in Nature that beauty really lay. So the Impressionists turned their

attention to all manner of subjects, and to whatever they touched, they brought the sense of light and airy colour, of transparency and life.

The criticism was levelled against them that they painted only the moment, not the lasting form, but in rescuing painting from the depths to which it was sinking, they are now recognized as having created the most beneficial movement in art for centuries.

Chief among the Impressionists were Claude Monet, Manet, Degas, Renoir and Pissarro. The Englishman, Sisley, who lived and painted entirely in France, and the American Whistler, were also



AN OLD PARISIAN SCENE IN THE IMPRESSIONIST MANNER

Edouard Manet, who painted the famous "Bar aux Folies Bergères," seen above, was one of the first masters of Impressionism in skill as well as in time. Here he has caught the whole brilliant gaiety of the auditorium, reflected in the mirror behind the barmaid, without losing any of the interest of the central figure. This picture is in the National Gallery, London.



VAN GOGH'S SUNFLOWERS

You might think it hard to make a masterpiece from so simple a subject as this, yet that is what Van Gogh has done. Not only does this famous picture show all that this Post-Impressionist stood for, both in intention and in execution, but it is, unlike many of his works, a picture that anyone can understand.

State Gallery Munich photo Hanfstaengl

notable exponents of Impressionism. Among later painters, whose style has been primarily influenced by this movement, Sickert and Tonks and Wilson Steer are pre eminent in Britain, while there is scarcely an academic painter of today who could have done the same work had these pioneers not gone before.

Impressionism was followed by Post-Impressionism. The Impressionists, in their search for light and transitory effect, tended to lose sight of the form and solidity of their subject. The Post-Impressionists worried less about what the object looked like to the eye at any given moment than about the actual content or meaning of the object. But in so doing, they did not mind if they distorted it or even made it completely unrecognizable. A good picture, to them, was one which conveyed the *spirit* of a scene, whether it reproduced the scene or not.

Post Impressionism, therefore, was the first step beyond

a representational art. Indeed, its exponents despised mere representation. This may sound difficult, and difficult it often is to see what the aim is in some of their paintings.

But, at the same time, we cannot help but admit that they produce the effect which they set out to produce. When their paintings were first shown in England, at a special exhibition held in 1911, the three great Post-Impressionists, Cezanne, Van Gogh, and Gauguin, were regarded as complete maniacs, and nothing too bad could be said about them or their work. Yet now they are appreciated as the leaders of a great movement—as men who took art for the first time successfully beyond mere representation.

From them, too, can be traced many of the numerous phases of abstract art, such as Vorticism, Cubism, Futurism and Expressionism, of which the last two were the especial product of Italy and Germany respectively. And even the Surrealist artists of today owe a good deal indirectly, to the Post-Impressionists, and through them to the Impressionists themselves.

The word Impressionism is also applied to music and literature which show the same basic movement as painting. The music of Debussy and Delius, for example, is considered as typically Impressionist, while the writings of Flaubert and Zola represent something of the same spirit in literature. (See illustrations pages 400, 1731, 1732)

In'cas. Scattered over the central highlands of the Andes of South America are found the remains of massive stone temples, palaces, fortresses, terraces and dwellings, with pottery, textiles and gold ornaments. These are the



IMPRESSIONIST PORTRAITS BY GAUGUIN *Giraudon*

Dissatisfied with his life under modern, civilized conditions, Gauguin migrated to Tahiti in the South Seas where his greatest masterpieces were painted. Here is one of them—a study of two Tahitian women on the beach, brilliant in colour, and beautiful in pattern. This picture is in the Luxembourg museum in Paris.



National Geographic Magazine

EXTRAORDINARY INCA MASTERPIECES OF MASONRY WITHOUT MORTAR

Among the greatest wonders of the ancient world are these two sites in Peru. Above, you see the tremendous walls of the hill-top fortress of Sacahuaman, some of the stones of which are over twenty feet in height, and weigh as many tons. Yet they were transported for over a mile, in a land where horses were unknown and then erected into their present positions, fitting closely together without mortar of any kind to bind them, so cunningly were they cut. In the lower picture the town of Machu Picchu is seen, perched high above the surrounding country and made likewise of huge stones clinging together by their own shape and weight holding for centuries without any material to make them do so.

INCAS

only traces so far discovered of the ancient civilization of the mysterious Incas, a race of Peruvian Indians that held sway for 1,200 miles from what is now Chile, north into Ecuador

Whether the Incas stood just at the beginnings of civilization, or whether, as some believe, they represent a culture as old as that of Egypt and more advanced than that of their Spanish conquerors, is still disputed. But they certainly left some remarkable monuments. Above the city of Cuzco in Peru, their ancient capital, towers stupendous ramparts made of individual stones of prodigious size. No mortar was used, yet after centuries these stones lie so cunningly fitted to each other that it is impossible to insert the blade of a knife between them. Some are 20 feet high and weigh many tons. Ruins like these occur in many parts of the Andes, together with remains of stone causeways and carefully terraced fields, all telling of a strong and highly gifted race. Rude records were kept by means of a system of variously knotted and coloured cords (called *quipu*), for the Incas were ignorant of writing. Later accounts, of doubtful reliability, ascribe to them a remarkable social organization, in which the land was allotted by the state in small holdings, irrigation was extensively practised, and poverty was unknown. The ancient population was said to be between 8,000,000 and 12,000,000.

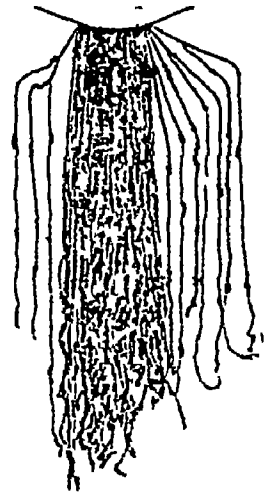
The Incas were skilful weavers, and seem to have been proficient in every style of hand weaving we know today. They also knew how to smelt metals and cast in moulds, and in the making of pottery they were artists. Evidently, also, they had made some progress in music, for among the remains of their civilization are found flutes made of bone and of cane, clay trumpets and trumpets of shells, bells of different tones, some made of bronze, some of pure copper. They built paved roads, with suspension bridges and post-houses at intervals over the wildest mountain ranges and desert for hundreds of miles.

The fall of this thriving and industrious race before Pizarro and his handful of Spaniards forms one of the tragedies of history and fur-

nishes the theme of Prescott's very interesting work on "The History of the Conquest of Peru." The spirit of the race was broken, and after a few disastrous rebellions it fell into the submissive apathy which marks the Peruvian Indians of today. Slaughter and oppression, continued through centuries, thinned their numbers until the pure blooded descendants of the Incas are now fewer than 3,000,000.

The literature concerning the Incas is scant and scattered, and on the whole somewhat sombre, dealing with "sullen peoples, half devil and half child." The memory of former wrongs has tinged their most popular songs with sadness—indeed, nearly all Inca lyrics are sad and reminiscent. And this is all the more remarkable, for (as a traveller writes) "the Indians are always singing. Far out on the pampas I have heard strange Kechu words crooned by little shepherd boys—but always there is sadness."

The Incas used to worship the sun, moon, and stars as lesser deities. Human sacrifices took place, but only occasionally, for their rites were not attended with such cruelty as those of the Aztec war-god (See Peru, Pizarro).



CORDS FOR COUNTING

These knotted cords were the basis of the ancient Inca system of keeping records and of counting. Our own 'knot in a handkerchief' as a reminder is apparently of very ancient origin!

British Museum

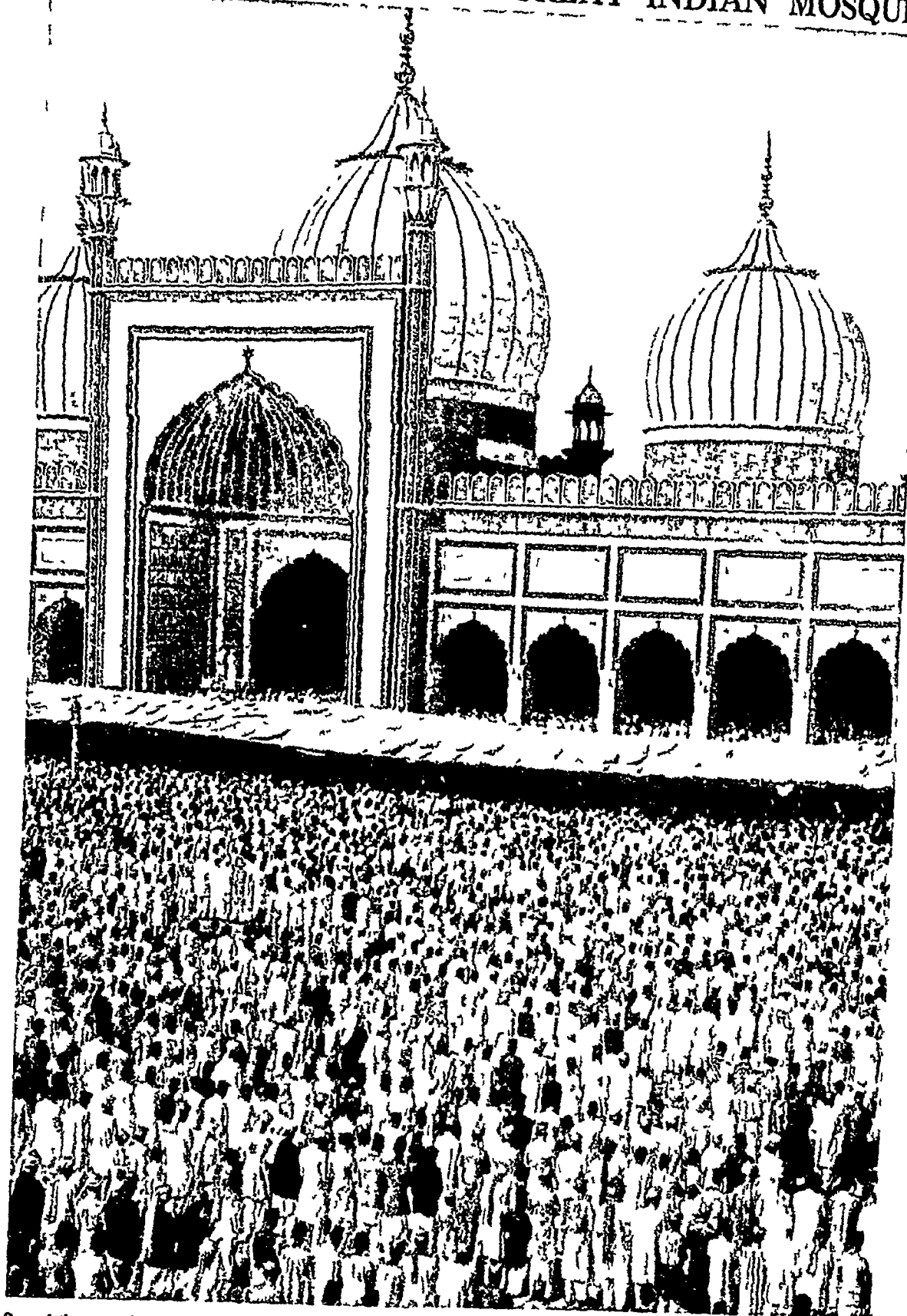


STRANGE PRE INCA VASES

British Museum

These two vessels date from an even earlier time than that of the Incas, but closely resemble Inca work. That on the left, done in red clay, shows the mastery of these Peruvian potters while on the right is another vessel, handle less and with its spout at the back showing an important dignitary of the time, apparently mummified.

DEVOUT MOSLEMS AT A GREAT INDIAN MOSQUE



One of the most famous mosques of India is the Jamma Masjid, or Great Mosque, of Delhi, which was built in the middle of the 17th century. The domes are of white marble, and in front of the building is a courtyard 450 feet square. This photograph shows the scene in the courtyard during a Mahomedan festival, when thousands who could not be accommodated in the mosque gathered before the doors. The mosque itself can hold 15,000 people, but even at Friday prayer it is so full that large numbers of worshippers cannot enter the building.

INDIA

The LANDS and PEOPLES of INDIA

For richness of life, India—with its violent contrasts, its colour, its crowded cities—has no peer From the Himalayan heights to Cape Comorin there stretches a scene of unequalled interest

India. A land of fascinating and infinite variety is India, which thrusts 1,900 miles downwards from the Himalaya Mountains into the Indian Ocean, and is inhabited by nearly 353,000,000 people or almost one sixth of mankind

And what contrasts among these crowded people, or rather peoples! They are divided into numerous races and clans, they speak more than 200 distinct languages and dialects, they profess countless shades of religious belief, they are split into different social castes, and they are grouped into more than 700 provinces and petty states. Despite their civilization reaching back 5,000 years, more than 90 per cent of these people cannot read or write in any language. Some of the princes are the most wealthy men in the world, yet poverty reigns for the most part

Extent—North to south, 1 900 miles, east to west, 2,000 miles. Area, about 1,800 000 square miles. Population about 353 000,000

Physical Features—Himalaya Mountains, the highest in the world (20 000 to 29,000 feet), Vindhya Range and Eastern and Western Ghats, inclosing the Deccan plateau, deserts in Sind and Rajputana. Principal rivers Indus, Ganges and Brahmaputra.

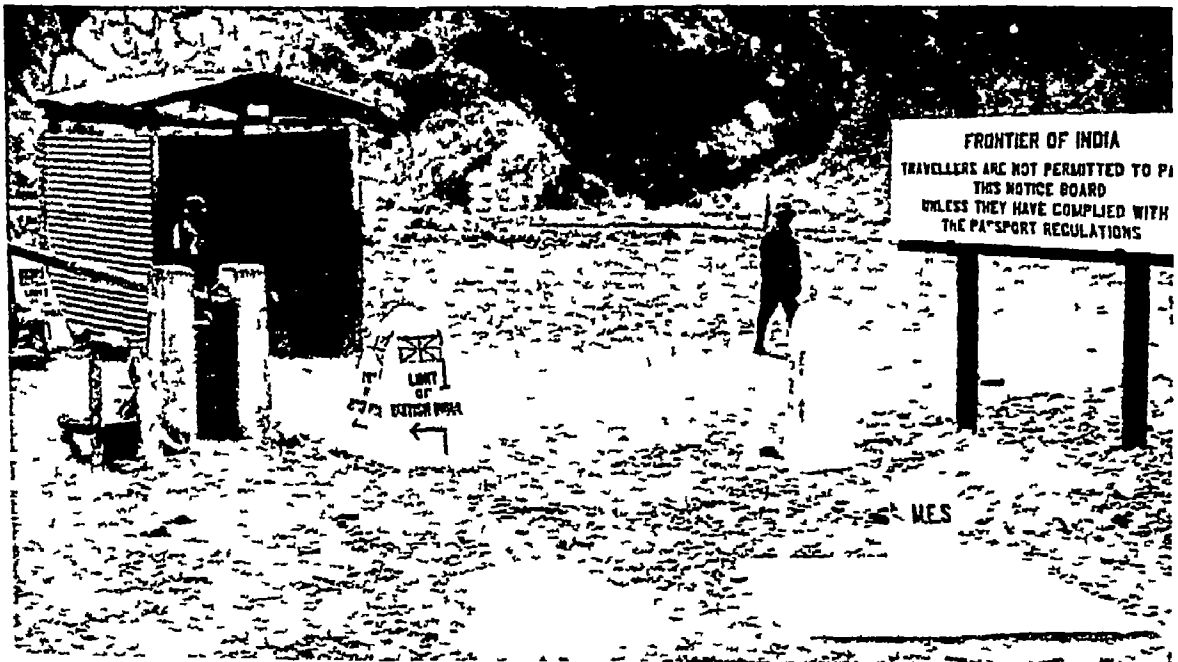
Products—Millet, rice, wheat, barley, oil-seeds, cotton, jute, sugar, indigo, coconuts, tobacco, tea and opium. cotton and silk manufactures, metal work, coal, gold, precious stones, and petroleum.

Chief Cities—Calcutta (1 486 000 population) Bombay (1 175,000), Madras (650 000) Hyderabad (466 000) and Delhi, the capital (470 000)

History—Aryan invasion about 1500 B.C., rise of Buddhism 6th century B.C., Alexander the Great's conquest of the north-west 327 B.C., Mahomedan conquest, A.D. 1001, establishment of Mogul empire 1526, English East India Company obtained trading posts at Madras (1639) Bombay (1668), and Calcutta (1696), battle of Plassey established British supremacy over the French, 1757, expansion of British India, 1774-1856, Indian Mutiny 1857, British Crown takes over government from East India Company 1858

A broad view of the country shows four separate and well defined regions. The mountain and hill districts of the Himalayan ranges, and the slopes of the Afghanistan and Baluchistan highlands form the northern and north-western borders. Then come the great river plains of the Indus, the Ganges and the lower Brahmaputra, forming a broad belt from the head of the Arabian Sea to that of the Bay of Bengal.

Next is the great tableland known as the Deccan, which includes the southern half of India, it is bounded by the range of hills known as the Eastern Ghats (literally "stepping stones") sloping down to the Coromandel Coast, and by the Western Ghats descending to the famous Malabar Coast. On the other side of the Bay of Bengal, and politically a part

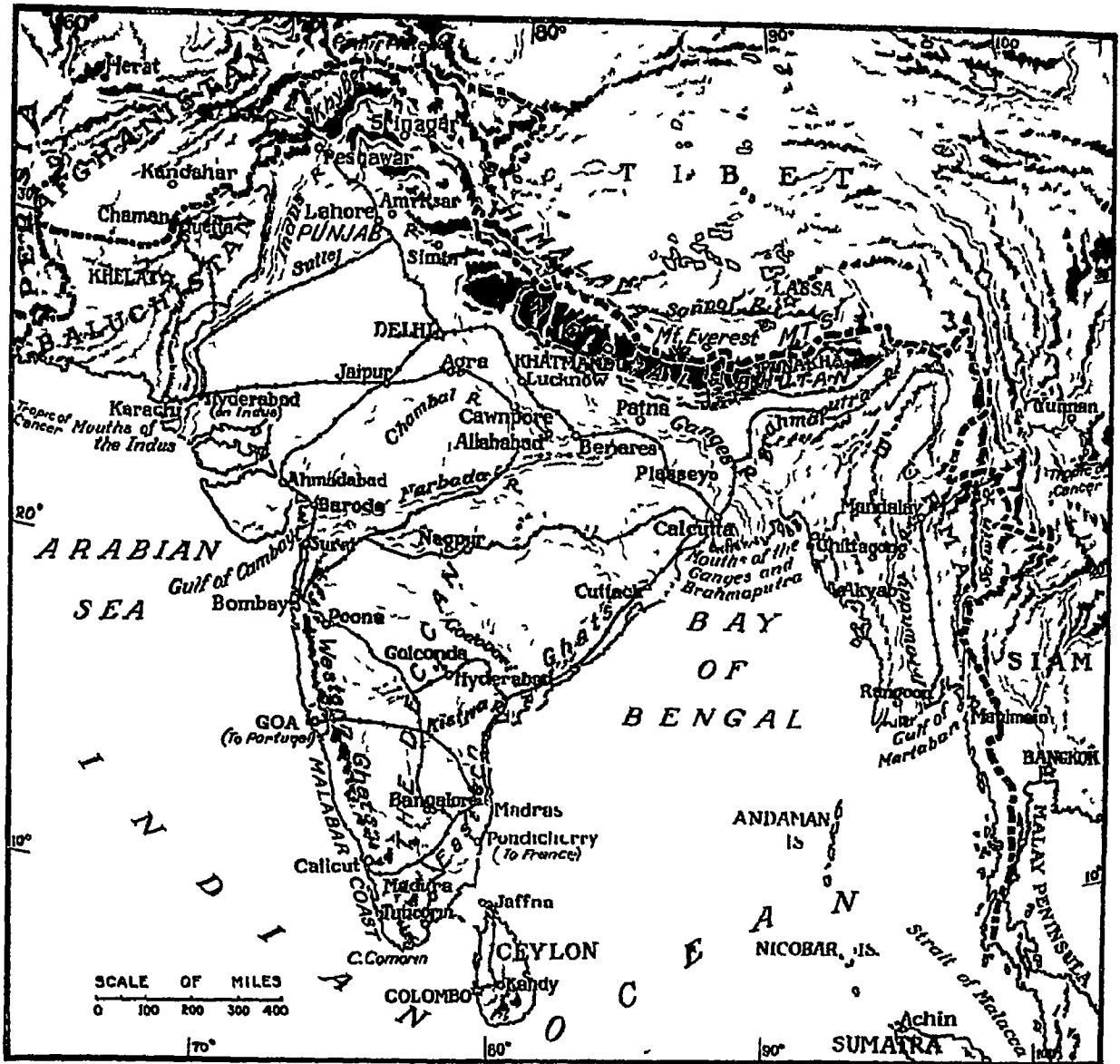


FAMOUS OUTPOST ON INDIA'S NORTHERN FRONTIER

This photograph was taken in the Khyber Pass, the great highway between India and Afghanistan which, since the days of Alexander the Great, has been the scene of much furious fighting. It is 33 miles long, but in places is only 15 feet wide, running through rocky defiles. The frontier between British India and Afghanistan crosses the pass at this point, and is guarded day and night by sentries, the credentials of everyone wishing to cross being closely scrutinized.

Fox Photos

INDIA



INDIA'S PLACE ON THE MAP OF ASIA

India, a land of contrasts in people and topography, is here spread out before us. It is shut off from Tibet by the famous "roof of the world," the Himalayas, with their eternal snows. To the north and west are the slopes of the highlands of Afghanistan and Baluchistan. Then come the great river plains, and next the vast tableland known as the Deccan with the giant stepping stones, the Ghats, sloping down to the eastern and western coasts.

of India until 1937, is Burma (*q v*), a hilly region south of the Brahmaputra valley and extending far down along the west side of Malaya.

The northernmost portion of India, and one of the most important of the native states is Kashmir (Cashmere) which extends over the first Himalayan ranges, and includes the famous Vale of Cashmere. Beyond the Indus, between Kashmir and Afghanistan, stretches the North-west Frontier Province—a wild rocky region, which forms a buffer between peaceful India and the untamed Afghan tribes. Here is the approach to the Khyber Pass, through which a railway now runs to the Afghan frontier.

The defence of the North-west Frontier is the chief overseas responsibility of the British Army and the Royal Air Force. The native soldiers—magnificent fighting men like the

Gurkhas and the Sikhs—take their place in the firing line with their white skinned comrades.

Even more wild and unsettled is Baluchistan, immediately to the south, which borders on Persia as well as Afghanistan. Only the northern part, about Quetta and the Bolan Pass, is under direct British rule. Nepal and Bhutan, on the borders of Tibet, are independent mountain states with foreign relations subject to British control. The highest mountain in the world, Mount Everest, actually lies within Nepal.

These mountain states and border districts form a picturesque background for the far more important river plains. Here is a tract of level cultivation about 2,000 miles long, and from 200 to 400 miles broad. The soil is composed of river sand and silt, washed down through countless ages from the northern slopes

INDIA

The Indus in the west and the Brahmaputra in the east have their sources in Tibet behind the snowy peaks of the Himalayas, at no great distance apart, and curving around in opposite directions include in their embrace not only the main Himalayan mountain chain but all that portion of northern India which is properly known as Hindustan. This country, in turn saturated by warm rain, chilled by light frosts, and scorched by desert winds, is the cradle of ancient Indian civilization. The Ganges valley is one of the most crowded regions in the world, many extensive districts supporting more than 600 persons to the square mile, all of whom get their living directly from the soil. By way of contrast, Baluchistan is very sparsely populated indeed, with six persons to the square mile.

Land of the Five Rivers

In this rich plains region are the Punjab, or "Land of the Five Rivers," with the important cities of Lahore, Amritsar, Simla, and Delhi, the capital of all India. Rajputana, a collection of about a score of small native states, with the cities Jaipur, Jodhpur, and Bikanir, the United Provinces of Agra and Oudh, with the famous cities of Allahabad, Cawnpore, Lucknow, Benares the "Holy," Agra, Bareilly, and Meerut, and the Bengal district with Calcutta, the largest city of India, and Patna as the principal places. Eastern Bengal and Assam, which lie beyond the Ganges, are also parts of this division.

The third division of India, the peninsula known as the Deccan, offers a marked contrast to the northern plains. The hill country begins not far south of Delhi, and spreads fan wise south east and southwest, while farther south a series of ranges crosses the peninsula from west to east. The Western Ghats follow the coast, closely rising in an unbroken wall to an altitude of 8,000 feet behind the old Portuguese port of Calcut. Close to the coast as they are, the Western Ghats form the true backbone of India, for from their rugged sides the whole country slopes generally eastward, the rivers which rise in their narrow landward gorges flow for the most part right across the peninsula and empty into the Bay of Bengal. The Eastern

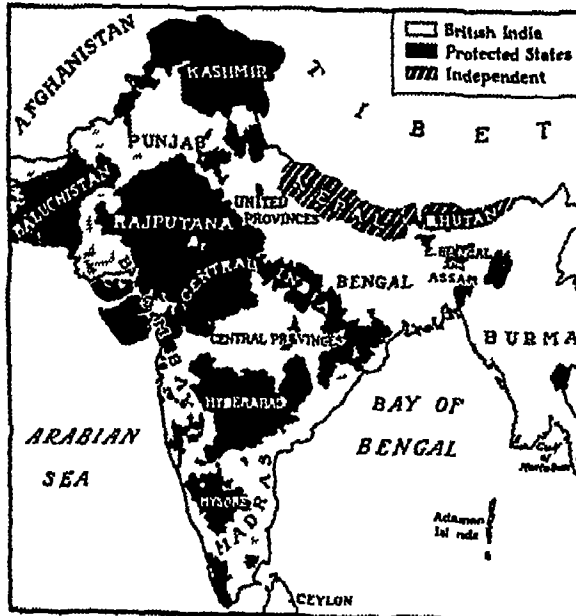
Ghats, on the other hand, are of no very great altitude, for they average less than 1,000 feet. They are broken through in a great number of places by rivers, both large and small, which cut deep gashes on their way to the sea.

The central Deccan consists principally of rough hills, some covered with dense forests, others with tall jungle grass, and still others, swept bare by dry winds. At intervals are broad, well-cultivated plateaux, and the banks of the numerous streams are dotted with tiny irrigated farms and cleared pasture lands.

The political divisions of southern India are more confused than are those of the north. The Bombay Presidency includes more than 350 small native states all of which are now under the control of the British Government or "Raj." Its chief city is Bombay, the second largest in India. East of the Bombay Presidency lie the native states of the Central India Agency and the Central Provinces under direct British rule. The cities of Gwahior in the north and Nagpur in the south are the most important. Farther south and occupying the very heart of the Deccan are the dominions of the Nizam of Hyderabad, the largest and most populous of the native states. (See Hyderabad)

The Madras Presidency, the largest of the British provinces, begins south of the Bengal district, includes the whole east coast to Cape Comorin, and extends to the west coast, almost completely surrounding the large native state of Mysore, and crowding the states of Cochin and Travancore into the south-west corner. This region, especially the Carnatic, is rich in historic traditions. The city of Madras is the third largest in India, and extends for some distance along the Coromandel coast, while among the other important places may be mentioned Madura, Trichinopoly, Tanjore, Calcut, Negapatam, Cuddalore, and Tuticorin.

The Andaman and Nicobar Islands in the Bay of Bengal are under the Indian administration. The former group, consisting of the Little and the Great Andamans, divided by the Duncan Passage, with a total area of 2,508 square miles, has been used as a penal colony. The Nicobar



POLITICAL PATCHWORK OF INDIA

This map shows how India is divided politically. The lighter portions constitute British India proper. The black portions are the so-called "Native States," which are ruled by the hereditary princes. Bhutan and Nepal are independent, except as regards their foreign relations. Burma is now governed independently.

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group consists of nineteen islands, twelve in habited. The total area is 635 square miles.

The French, who were once supreme in India, retain the following stations and trading posts: Pondicherry, Karikal and Yanam on the Coromandel coast, Mahé on the Malabar coast, and Chandernagore in Bengal. These possessions with a total area of 203 square miles, are administered by a governor residing at Pondicherry. The Portuguese retain some territory on the Malabar coast: Goa (1,469 square miles), the seaport of Damão, which is situated about 100 miles north of Bombay, and the island of Diu, on the other side of the Gulf of Cambay.

Picture to yourself a typical Indian scene during the months of April and May. The

south-west monsoon, which blows from June to October, and the "lesser" or north-east monsoon, which blows during November and December. The mountainous wall of the Western Ghats causes the more southerly currents to release most of their moisture on the west coast. The winds which enter over the Sind coast do not strike a cooling mountain range until they have crossed the Sind desert and most of Rajputana, so that they carry a great part of their moisture far into the Punjab, or sweep eastward along the Himalayan barrier, shedding their rain through the United Provinces and Bengal. In eastern Bengal these winds meet the monsoon coming up the Bay of Bengal, and the two together sweep onward

until they strike the Assam hills, where they drop their double charge of moisture. This explains why Assam has the largest rainfall of any country, the average in the Cherra Punji district being 424 in a year. In Great Britain we get an average of about 23 in, and then often complain about it being wet!

As the land cools under the influence of the rains, the south-west monsoon blows itself out in October, and in November the north-east monsoon sets in. This carries rain to the east and south-east and to the central plateau of the Deccan, which, as we have seen, are deprived of their due share of the earlier moisture by the barrier of the Western Ghats. A good monsoon season means plenty of food for India, a bad monsoon season means famine, misery,

and death for hundreds of thousands of helpless victims.

In general, southern India enjoys a more equable climate than the river plains or mountain regions. The latter are subject to extremes of heat and cold, dryness and moisture. In Sind and the Thar desert are places where day after day in the summer the thermometer reaches 110° in the shade, and it is not uncommon to see a drop or a rise of 70° within 24 hours.

The scourge of malaria and other "Indian fevers" claim a greater number of victims each year than all other causes, including even cholera and plague. The great work of the Indian Medical Service, under the British Government and recruited from famous British



CLOUDS THAT FORETELL INDIA'S MONSOON W. Stokes

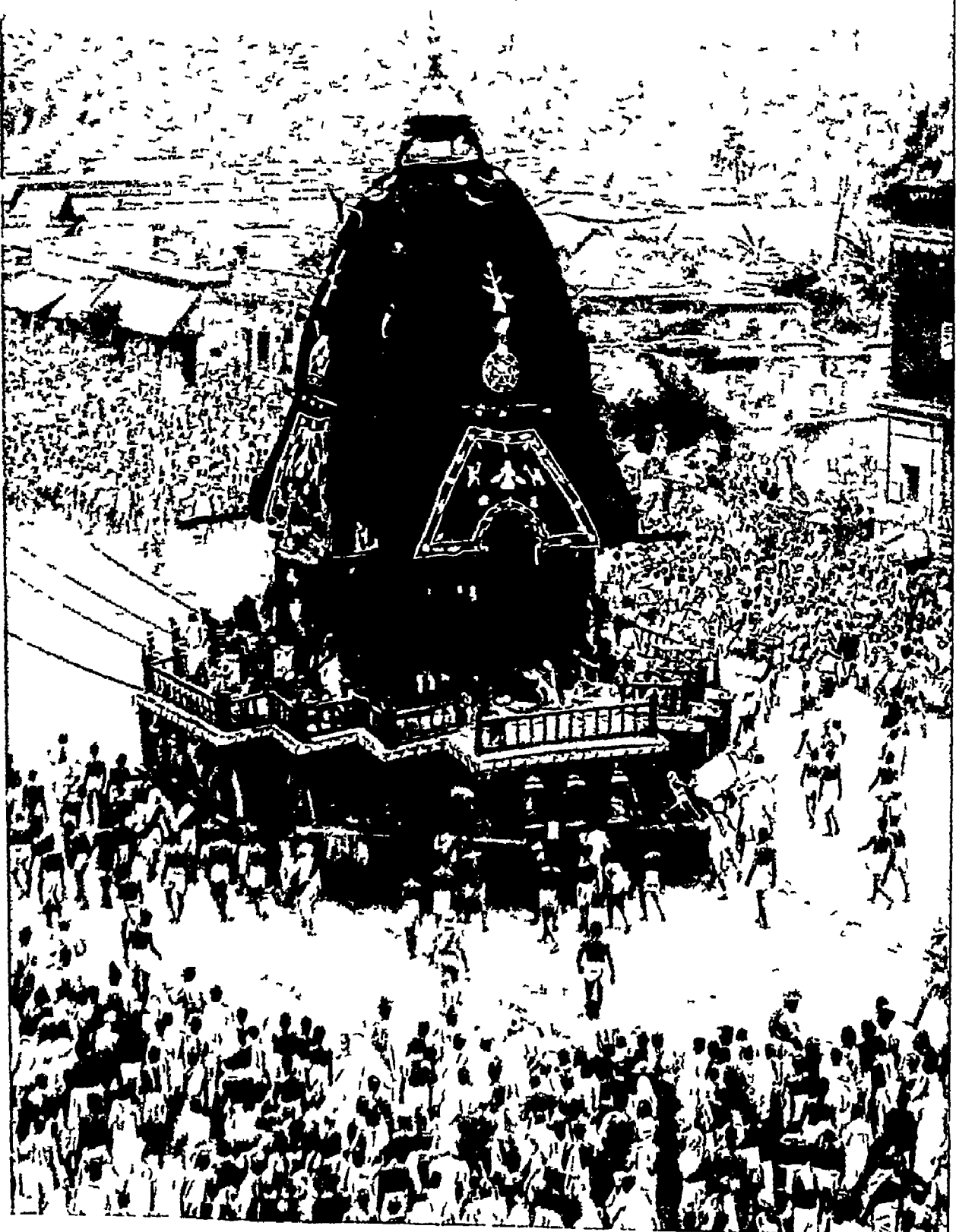
The "great" monsoon is a rain-bearing south-west wind which blows over the Indian Ocean from June to October. It is caused by the extreme heat of the interior of Asia, which "sucks" cooler air from the sea across the Indian peninsula. This photograph shows evening over the Ganges at Cawnpore at the approach of the monsoon, when the rain-laden clouds are beginning to cover the sky, and the dust in the air causes superbly coloured sunsets.

burning and pitiless sun looks down upon a land sapped of its strength. The baked earth seems dead, the dried grass rustles with the scorching breath of the wind, the very blue of the sky seems to turn brassy in the intolerable white light of noon.

Presently a dust-storm advances. Behind this rise great black clouds, rolling forward like a tidal wave. The storm bursts overhead with a roar and the water strikes the ground in sheets. The great monsoon has come: the annual south-west wind which brings life-giving rains to northern India. Within a week, the bleak country has become again a mass of green.

The monsoons are the salvation of the millions in India who live on the fruits of the soil. There are two of these winds, the "great" or

CUSTOMS AND COSTUMES OF INDIA



This Hindu idol—Juggernaut, Lord of the World, to give him his full title—is kept in a temple at Puri in Orissa. On the most important of the many festivals dedicated to the god, the idol is dragged by hundreds of devotees from the temple for about a mile and back. Owing to the weight of the car and the nature of the road the journey takes several days.



Bourne & Shepherd

LORD HIGH EXECUTIONER OF OLD IND

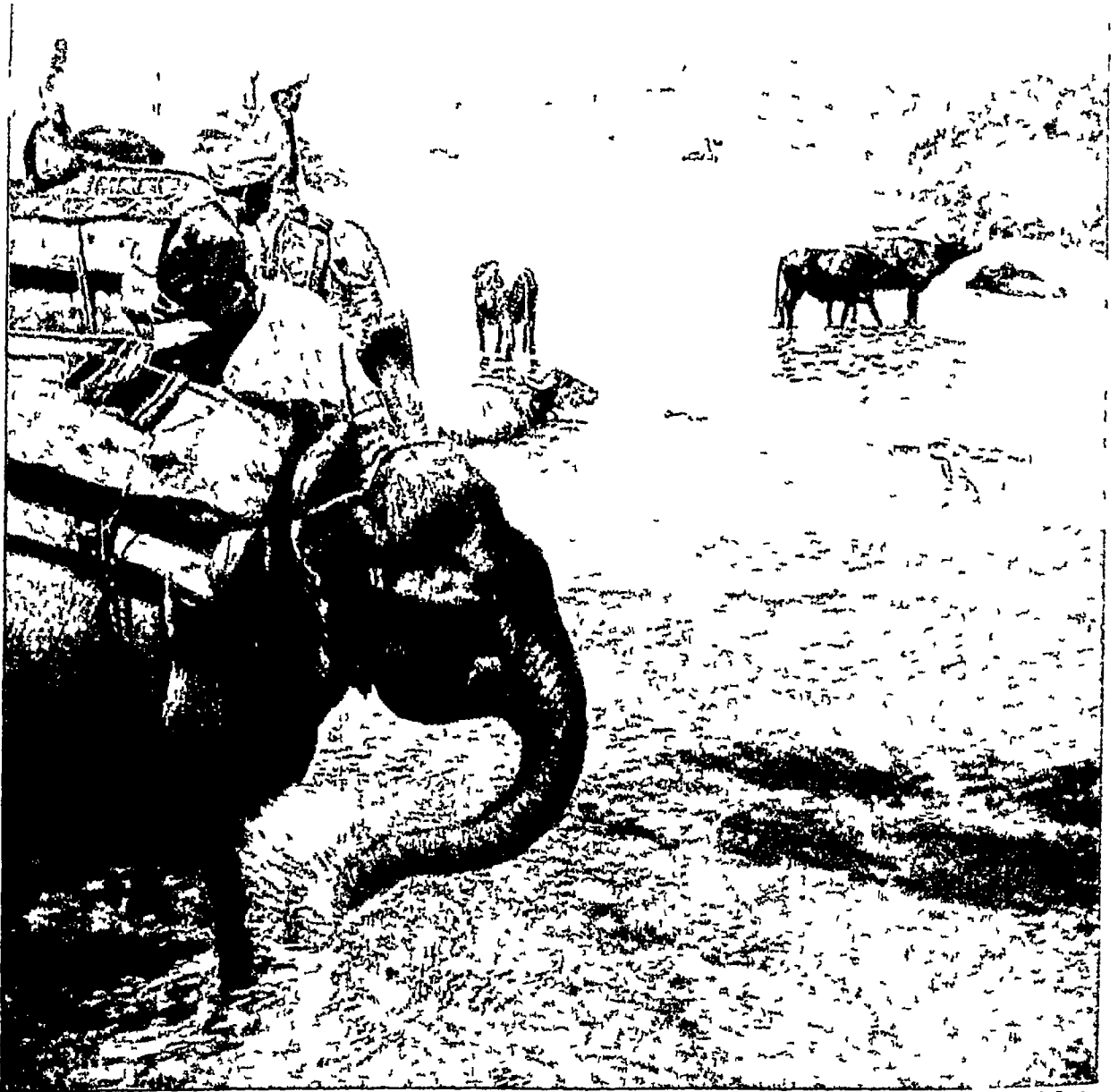
No part of the Indian Empire is more deeply steeped in old tradition than the native states, collectively known as the Central India Agency, and there many quaint costumes survive from the past. This weird figure for example, is the executioner of Rewa. His terrifying uniform has been worn from time immemorial.



TRIBESMEN OF THE NORTH-WEST FRONTIER

The north west frontier of India has been the scene of many armed conflicts between British troops and the turbulent tribes who dwell beyond it. The most troublesome are the Pathans two seasoned warriors of which tribe are here seen. They are excellent marksmen and extremely cunning and practised in guerilla warfare.

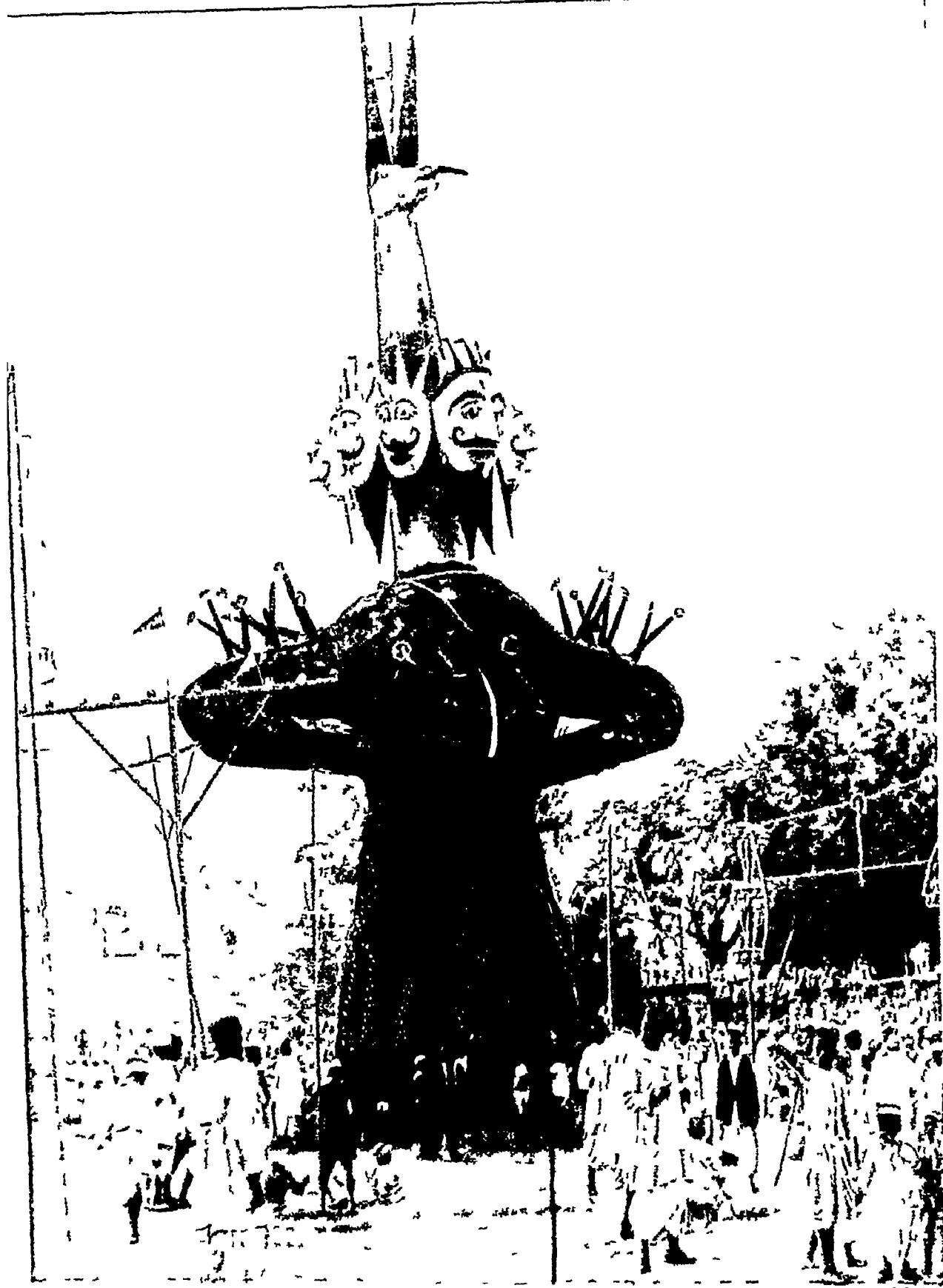
A 'COOLER' BENEATH THE TORRID INDIAN SUN



Edward E. Long

When the scorching midday sun beats down on the plains of Central India, the cattle leave the pastures to cool their feet in the shallow waters of the rivers. Here, beside them, the "mahouts," as elephant drivers are called, have brought their patient beasts down to the stream for a welcome drink and bath. These are the only elephants that will be seen in the plains, for wild elephants in India are now almost entirely confined to the hills, where they are rounded up and trained for the service of Man.

GIGANTIC 'GUY' OF A HINDU RITUAL PLAY



This grotesque figure plays a part in the religious play, Ram Lila performed at Cawnpore. It is made of bamboo and paper like a giant "guy" and is filled with fireworks. It represents Ravana the demon king of Ceylon, who is eventually slain by firing a blazing arrow into his highly inflammable interior so that his brief life ends in a great display of fireworks.



Uththara Photo Service

INDIAN IVORY-CARVER AT WORK

The native craftsmen in the Indian bazaars have inherited through the ages delicacy of execution and beauty of design in their artistic products. This photograph shows a worker in ivory putting the finishing touches to a model of a ceremonial elephant. Great patience is needed to achieve the accuracy of detail which such carvings show.



Central News

DANCING GIRLS OF A HINDU TEMPLE

Above is a scene in Central India when nautch girls in brightly coloured gowns perform a ceremonial dance in a temple. Nautch girls are priestesses of the god Siva and they are chosen for their good looks, though the fifth daughter of a family is generally considered the most eligible. The dancing consists of posturing and ceremonial steps.



Underwood

WHERE A GREAT RAJAH LIES ENTOMBED

This photograph shows a scene in the city of Alwar, the capital of the state of Alwar in Rajputana. In the background is the Mausoleum of Bakhtawar Singh, built of white marble. In front of the Mausoleum is an artificial pool into which graceful little summer-houses jut out. In the precincts are hundreds of blue pigeons.

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medical schools, has greatly mitigated the incidence and severity of endemic diseases in India. In this connection the names of those great leaders in tropical medical research—Sir William Leishman (1865–1926), Sir Patrick Manson (1844–1922) and Sir Ronald Ross (1857–1932)—will be long remembered. Europeans during the hottest weather usually seek the high altitudes of Simla (India's summer capital), Kashmir, Bangalore, Ootacamund and elsewhere.

The Himalayan climate is favourable to a tremendous variety of plant life. Below the snow line are to be found vast fields of rhododendrons, then thick forests of evergreens, and on the damp lower slopes to the east a rank and tangled undergrowth of coarse grass, bushes, cane brakes, bamboo and great trees whose branches are thick with beautiful orchids.

The plains region is notable for the babul, a species of acacia, the mango, the banyan, the plantain and the betel palm. The northern Decan forests consist chiefly of scrub trees, but in the south teak, sandal wood and satinwood flourish abundantly.

Wild animals abound all over India, for religion forbids the majority of the people to kill most living creatures. The tiger is found in all the wilder forest regions and is responsible for about 500 deaths a year throughout the empire.

Lions, once plentiful in Hindustan, are now confined to the Kathiawar peninsula between the Gulf of Cutch and the Gulf of Cambay. Bears are numerous in the mountains and leopards infest many of the more remote tracts. Elephants still exist in the primeval forests of the south west, but domestic elephants are mainly recruited in the hills of Assam and Burma, where dwells also the rhinoceros.

The gaur or Indian bison, the wild buffalo, and the wild pig offer exciting sport to the hunter. The wolf, the jackal, the wild dog, and the striped hyena are plentiful. Monkeys are

numerous near settlements and do great damage to crops. The larger rivers are filled with crocodiles, snakes abound in all districts, the cobra and the krait being the most dangerous, causing thousands of deaths annually. Insects are incredibly numerous. A few, such as the bee, the silkworm and the lac insect, are encouraged for their useful products.

The population of India may be roughly placed in five groups:

- (1) The descendants of the earliest known inhabitants of India, sometimes called Dravidians, who are represented by the savage Bhils and Gonds of central and western India, and by the Tamils of the south.
- (2) The pure-blood descendants of the successive tides of Aryan invaders who conquered the Dravidian inhabitants and who are best represented by the Rajputs.
- (3) The great mass of Hindus formed by a mixture of the two preceding types.
- (4) The descendants of the Mahomedan invaders from Persia in the 7th century.
- (5) The Mongol or Tibetan types, found chiefly in the extreme north east and in the Himalayan border regions.

The people of Dravidian stock are short, dark, with curly or wavy hair and broad noses. At the other extreme are the Rajputs, tall, slender and handsome.

The many separate languages of India can

be generally divided into those derived from the ancient Sanskrit and those from the early Dravidian tongues, with a mixture of Malayan and Chinese elements. In northern India the inter-state and inter-tribal dialect is Hindustani or Urdu, a blend of Persian with the dominant "Hindi" language—a pleasing combination. In the south Telugu and Tamil, both Dravidian tongues, are spoken by some 20 million people.

The chief religions of India are the Hindu, Mahomedan, Buddhist, Sikh, Jain, Christian and Parsee. Next to the crude beliefs of the primitive hill peoples, who see gods in rocks and



AN INDIAN BOY'S BATH

Ceremonial washing is an important part of the Hindu religion and personal cleanliness is inculcated in her children by the Hindu mother. There are no bathrooms in Indian villages, and washing must take place in the open. Here a Hindu mother completes her son's ablutions by giving him a shower-bath from a bowl.

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trees, Hinduism is the oldest religion and includes in its numerous sects more than 230 million persons, about 68 per cent of the total population. Hinduism (q v) has many forms, all of which are marked by a belief in many gods and in universal reincarnation. The Sikhs form a religious community whose history dates back to the 16th century. Their faith is a curious mixture of Mahomedanism and Hinduism, and for a time they constituted a powerful and formidable military brotherhood. Today the Sikhs number somewhat more than four millions.

The Jains, on the other hand, tend to combine the Buddhist and Hindu religions. There are today about 1,250,000 Jains, and among them are many of the richest and most influential of Indian merchants. Their temples, among which are the famous ones on Mount Abu, are the finest in all India. The Parsees are descendants of Persian Zoroastrians—fire and sun worshippers, who fled to India to escape the Mahomedan massacres of the 7th century. They form now a rich merchant class of great power, though they number only just over 109,000.

The native Christians of India total about six millions, the Roman Catholics being far the most numerous. The Mahomedans, with over 77 mil-

lions, form the largest religious group next to the followers of Hinduism. (See Mahomet). The Buddhists, once exceedingly powerful in the land, have virtually disappeared from India proper, of the 11,000,000 counted in the empire today, all but about 300,000 are found in Burma.

Thousands of Different Castes

The followers of Hinduism, which means at least two-thirds of the population, are grouped into countless castes which are half social, half religious. The caste system had its foundation in the old Aryan law, which divided the people into four classes—the priests or Brahmins, the warriors or Kshatriyas, the farmers or Vaisyas, and the labourers or Sudras.

Today these four original castes have been subdivided again and again until it is almost impossible to tell the number of separate castes. Estimates vary between 2,000 and 3,000 distinct groups. The members of each handicraft, such as potters, jewellers, etc., tend to form separate castes which amount to trade guilds or unions.

The restrictions which surround members of a caste are innumerable. Generally speaking, a person may not marry outside his caste, nor may he touch or associate with a member of a lower caste. Certain of the high-caste Hindus feel

that they are profaned if even the shadow of a European or of the member of a lower caste falls upon them or their food or anything which belongs to them, and that they must thereupon perform elaborate rites of purification.

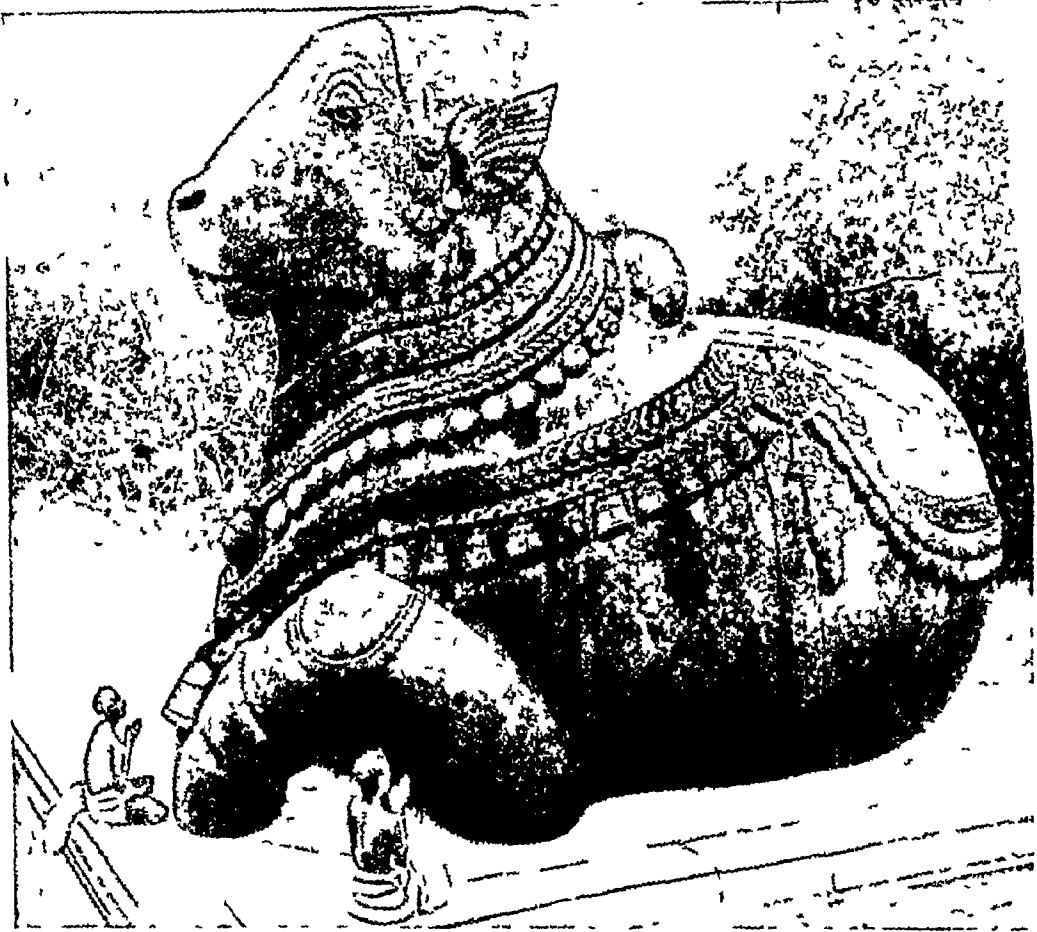
Lower yet than the Sudras are the Pariahs or outcasts—a mass of 60 million people, one sixth of all the population of India. These "untouchables" are prohibited the use of public roads, bridges and temples. They are forced to live outside the villages and are allowed to enter only such despised occupations as street-sweeping and leather-working. So defiling is their touch that most Hindus would rather die than accept their help, and they are not even allowed to draw water from the public well.

The average Hindu is a peaceful, patient person. "Life in India," says one writer, "is regarded in a very serious spirit by which even the children are subdued. You will never see them romping at play, and their games are of the quietest description."



SACRED COW IN AN INDIAN STREET

Cows to the Hindus are sacred animals and are privileged to come and go as they wish, even in the cities. This photograph shows a street scene in an Indian city when a cow, tired of walking the streets, has lain down on the pavement for a rest. Because she is holy no one disturbs her, nor would they do so if she had chosen the middle of the roadway for her resting place.



THE GIANT BULL OF SIVA WITH HAUGHTY AIR

This immense figure carved from stone stands near the city of Mysore. See that look of calm disdain on his face while the two Hindus kneel before him in prayer! That is because he is a representative of the god Siva and because under that great hoof rests the fate of many a poor worshipper—or at least so millions of Hindu devotees throughout India believe.

They never tease animals, and the birds and beasts of the household are extraordinarily tame. They are not petted but treated with consideration due to members of the family.

"To adults life offers few pleasures. Eating is a monotonous experience of the plainest dishes. There are no attractions in sport or in physical exercises. Fairs and festivals give some excitement to the women who can attend them, but the men derive their pleasure rather from the gratification of a sense of dignity and importance than from the exercise of the functions of mind or body."

The position of Indian women is not enviable. They are usually not permitted to learn to read and write, but are closely confined to their homes, where they perform all the menial tasks. They are not even allowed to sit down to meals with their husbands, but must serve them in silence and take what they leave. A recent census showed that more than 2,000,000 girls were married before the age of ten. The Sarda Act of 1930 penalizes marriage until the bride is fourteen and the bridegroom eighteen.

Although the practice of *suttee*, which allowed a Hindu widow to burn herself on the pyre of her husband, has been stamped out, a widow must keep her head shaved, give away all her jewels, and, usually, perform the most menial labour for her late husband's family.

At the dawn of history India was already famous for its wealth, its gold and silver and precious stones, its fine silks, its spices and drugs and rare woods. Treasures from India reached the ancient courts of Assyria and Egypt.

Today India's wealth is not reckoned in gold or precious stones, but in the products of the fields. Agriculture is the most important industry, 230,000,000 of the population living by farming, forestry, and stock-raising.

The millet grains form the chief crop, for these hardy, drought-resisting, and prolific cereals are the staple food of the lower classes. Almost the entire crop is consumed at home. Next in importance are rice, wheat, rape, mustard and pulses (lentils, chick-peas, etc.).

Oil seeds and oil producing plants, such as linseed, rape, mustard, sesamum, ground-nuts,

PAGEANTRY AND PRIMITIVE LIFE SIDE BY SIDE



The top photograph shows a scene in Lashkar, the capital of Gwalior, a "Native State" which is ruled by an independent prince. The Maharajah is shown passing through the Sarapa, or merchants' quarter, riding on an elephant and attended by a great retinue. The photograph below shows the river Jhelum where it flows through Srinagar, the capital of Kashmir. The river is crossed by seven primitive wooden bridges, one of which is seen in the photograph. The little boat and the fishing net are such as have been used by the riverside folk for hundreds of years.

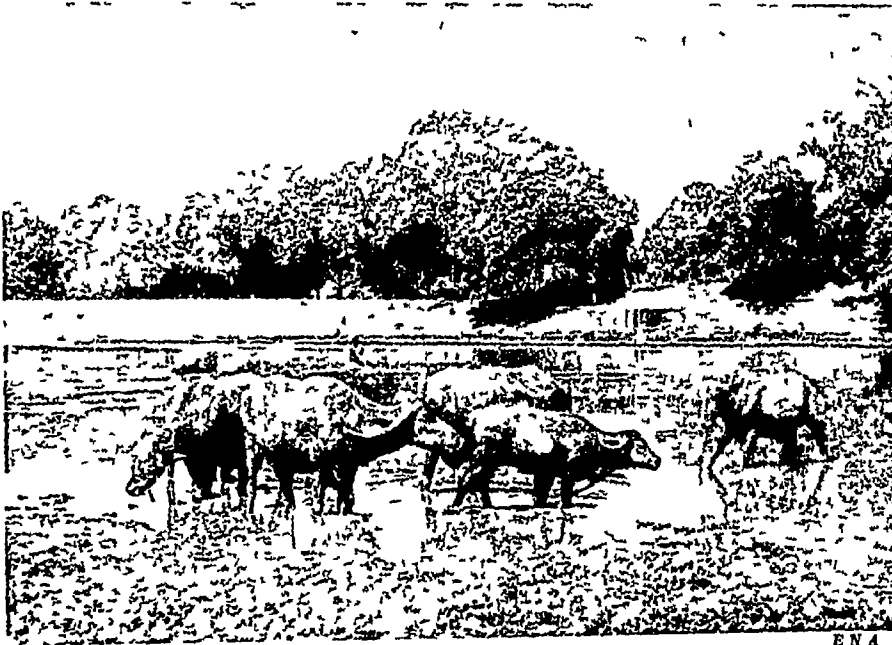
Photos top H S Talbot lower Fox Photos

FIGURES OF THE ROADSIDE IN ROMANTIC INDIA



Those who know their Kipling are familiar with the pageant of the Indian highway, where figures like these are everyday sights. Top left, an Indian peasant at a roadside well in Rajputana, filling his water-skins and loading them on his donkey. Top right a native workman in the Lako bazaar, Simla, making rolling pins, he uses his feet to hold the wood which he is shaping. Below, one of the itinerant entertainers, who travel from village to village, this one is a trainer of birds, called "weaver birds," which can be taught to do many tricks, such as retrieving a ring thrown into the air.

Top left Dorcen Leigh top right and bottom W. Stokes



INDIA'S SEMI-DOMESTICATED WATER BUFFALOES

Similar in many ways to the African buffalo (see page 81), the Indian species has for many years been semi-domesticated, although wild herds still exist. These beasts are very fond of wallowing in the mud, as you see in this photograph, their distinguishing feature is the length and spread of the horns.

castor-oil plants, etc., are extensively grown. The natives use vast quantities of oil for cooking, for their primitive lamps, and for anointing themselves, and large quantities are exported.

Cotton is one of India's most valuable products. Other crops of importance are barley, jute, sugar-cane, indigo, tea, and tobacco. Rice and wheat are also exported.

Coal, gold (especially from Mysore) and petrol are the leading mineral products. Rail way development has proceeded further in India than in any other part of Asia. About 40,000 miles are now in operation, consisting of broad-gauge trunk lines connecting the large centres of population, and a network of narrow gauge lines. There are also regular air services between Europe, India, and the Far East.

INDIA'S LONG *and* TROUBLOUS HISTORY

The history of India is largely a chronicle of invasions, from those of the Aryans of antiquity to those of European nations in comparatively recent times. Only under British guidance is India learning to rule herself.

India, HISTORY OF The early history of India is merely tradition. The great Hindu epic poem "Rig-Veda," written about 1500 B.C., tells of the old struggle between the Aryan invaders and the "black people" who were in possession of the soil. By the 6th century B.C. sixteen Aryan states had been established south of the Himalayas, and Brahmanism was flourishing. In 327 B.C. the armies of Alexander the Great reached the Hydaspes River, and the Greek settlements he left behind made a profound impression upon the art and literature of the country. The next 1300 years were marked by a succession of bitter struggles for power between the Indian princes, and by a succession of invasions.

The first attacks of the Mahomedans were repelled, but in the 11th century the Turkish leader Mahmud established the Ghazni dynasty in the land. The great Mongol invasion of

Genghis Khan followed in 1219, and in 1397 Tamerlane's Tartar hordes poured into India (See Mongols). In 1526 Babar, who was a descendant of Genghis Khan as well as of Tamerlane, seized the throne at Delhi, establishing the great Mogul empire, which remained intact until the close of the 18th century.

The south of India was never completely conquered, but the empire of the north, under such rulers as Akbar and Shah Jehan, was perhaps the most brilliant in the history of the Orient. During the reign of Aurungzebe (1618-1707) arose the power of the Mahrattas in the south.

Meanwhile, the struggle between Europeans for supremacy in Indian affairs had begun. With Vasco da Gama's discovery of the ocean route around the Cape of Good Hope in 1498 there began a race for the rich Indian trade between Portugal, Holland and France. In 1600 the English East India Company joined in

INDIA

the rivalry, and soon had trading posts at Madras, Bombay and Calcutta (then called Fort William) The history of India from that time forward deals chiefly with the long commercial struggles of these European rivals The French enlisted native troops, and interfered so successfully in native quarrels that by 1751 the Carnatic and the Deccan were under French influence

Just as British influence was threatened with extinction in India, the genius of Robert Clive turned the tables First his storming and successful holding of Arcot in 1751, and then his victory at Plassey in 1757, overthrew the French power and laid the foundations of the rule of the East India Company (See Clive, Robert) Later, mere trading rights gradually grew into political rule It was one of the strangest conquests in history, this by which a private trading company conquered an empire by the use chiefly of soldiers (Sepoys) raised in that land itself

Warren Hastings, who became Governor-General for the East India Company in 1774, built soundly upon the foundation Clive had laid He subdued the Mahratta princes and crushed the famous Hyder Ali, sultan of Mysore (See Hastings, Warren) In the next 30 years the rule of the Company extended over a great part of India Between 1848 and 1856 the Sikhs were defeated and the Punjab was annexed

But certain high handed methods employed by the Company stirred up a wave of unrest In 1857 a rumour was circulated among the native troops enlisted under the British flag that the cartridge papers, which the soldiers

must tear with their teeth, were greased with the fat of cows and pigs—the former held sacred by the Hindus, and the latter abhorred by the Mahomedans This rumour set fire to the tinder of discontent, and the great Indian Mutiny of 1857 was the result The insurrection spread rapidly in the north Nana Sahib, a Mahratta prince, besieged a British force in Cawnpore and, after promising safe conduct treacherously massacred his prisoners, including women and children Another British force was besieged in Lucknow, but after the commander Sir Henry Lawrence, and many others had been killed, the survivors were rescued Not until Delhi was captured in September was the mutiny broken

After the Indian Mutiny

This tragic outbreak put an end to the political rule of the Company In 1858, its rights of government were transferred to the crown, and the last flames of the mutiny were quenched Since then greater respect has been shown to the religious and other susceptibilities of the people, and about two fifths of India is still left to be ruled by its native princes In 1877 Queen Victoria was proclaimed Empress of India

British rule has brought not only the great gift of peace but factories, railways, hospitals, police, Western courts, modernized cities, schools and universities, and brisk trade But to quote the Earl of Ronaldshay, "the organization of industries on the lines evolved by Western nations is something which is altogether alien to the genius of the Indian people" The



ENGLAND'S FIRST AMBASSADOR TO INDIA

The foundations of British supremacy in India were laid by Sir Thomas Roe, who was sent in 1614 on an embassy to the Court of the Mogul Emperor, Jehangir, by the East India Company After a six months' voyage round the Cape of Good Hope Roe arrived in September, 1614, and remained at the Court of the Emperor for a year, during which he concluded a commercial treaty and arranged for a continuation of the existing concessions to English merchants This picture by Sir William Rothenstein shows Sir Thomas Roe in the presence of the Great Mogul.

conflict between the two races was greatly intensified after the World War. During the war, India loyally sent money and men to the aid of Britain. These men returned with a new sense of the importance of India to the Empire, and demanded a larger share in the government. The Act of 1919 promised it to them. India signed the peace treaty and was made an independent member of the League of Nations. But the Indians were not satisfied, and the demand for home rule was intensified.

Gandhi and the Home Rule Movement

In a rebellion against foreign domination and Western civilization, the strange ascetic, Mohandas Gandhi, squatting in his white robe before a spinning wheel, initiated the Swaraj, or Home Rule movement. (See Gandhi) He urged passive resistance, and tried to end the cruel caste system, and the wasteful hate between Mahomedans and Hindus, so that India might present a united front against everything British—government, imports, machinery, philosophy. But another faction of Swaraj, led by Chitta Ranjan Das, urged violence, and, by propaganda and terrorism in Bengal and in the Central Provinces, almost succeeded in destroying all respect for law and order. But strong disciplinary measures, imposed by the government, quickly restored the situation.

At the same time Communism was gaining, and the country was more and more torn by the religious feuds between Hindus and Moslems. These riots became more frequent in 1926. Conditions were so bad that Britain had either to face a crisis in which it might be the loser, or grant India a larger measure of self-rule. In accordance with the Act of 1919 the government of 1927 appointed a commission, with Sir John Simon as chairman, to inquire into the advisability of altering the constitution, and to investigate all phases of the government of British India. But there were no Indian representatives on this commission, and Indian Nationalists were enraged. Opposition by the Indian National Congress increased, and the civil disobedience campaign, or passive resistance, continued with greater intensity than ever.

The 'Salt Rebellion' of 1930

During 1929 Indian Nationalism grew in ardour. In March, 1930, Gandhi demanded immediate dominion status for India, and when it was not granted he inaugurated his "Salt Rebellion," attacking the government monopoly as unjust oppression. As before, he stressed his policy of non-violence, but without avail. Rioting broke out afresh and Gandhi and his associates in the campaign were imprisoned.

The report of the Simon Commission, made public in June, 1930, outlined a new constitutional organization for British India on the basis of a federation of autonomous provinces. With

the exception of Burma, which was to develop separately towards self-government, all the provinces were included in this proposed system. A "round-table conference" of British and Indian leaders to consider the details of such a scheme met in London in November, 1930. Inasmuch as the Nationalists of India refused to participate and there was disagreement between Moslem and Hindu delegates, the conference was not considered successful, but an outline for a new constitution was drafted.

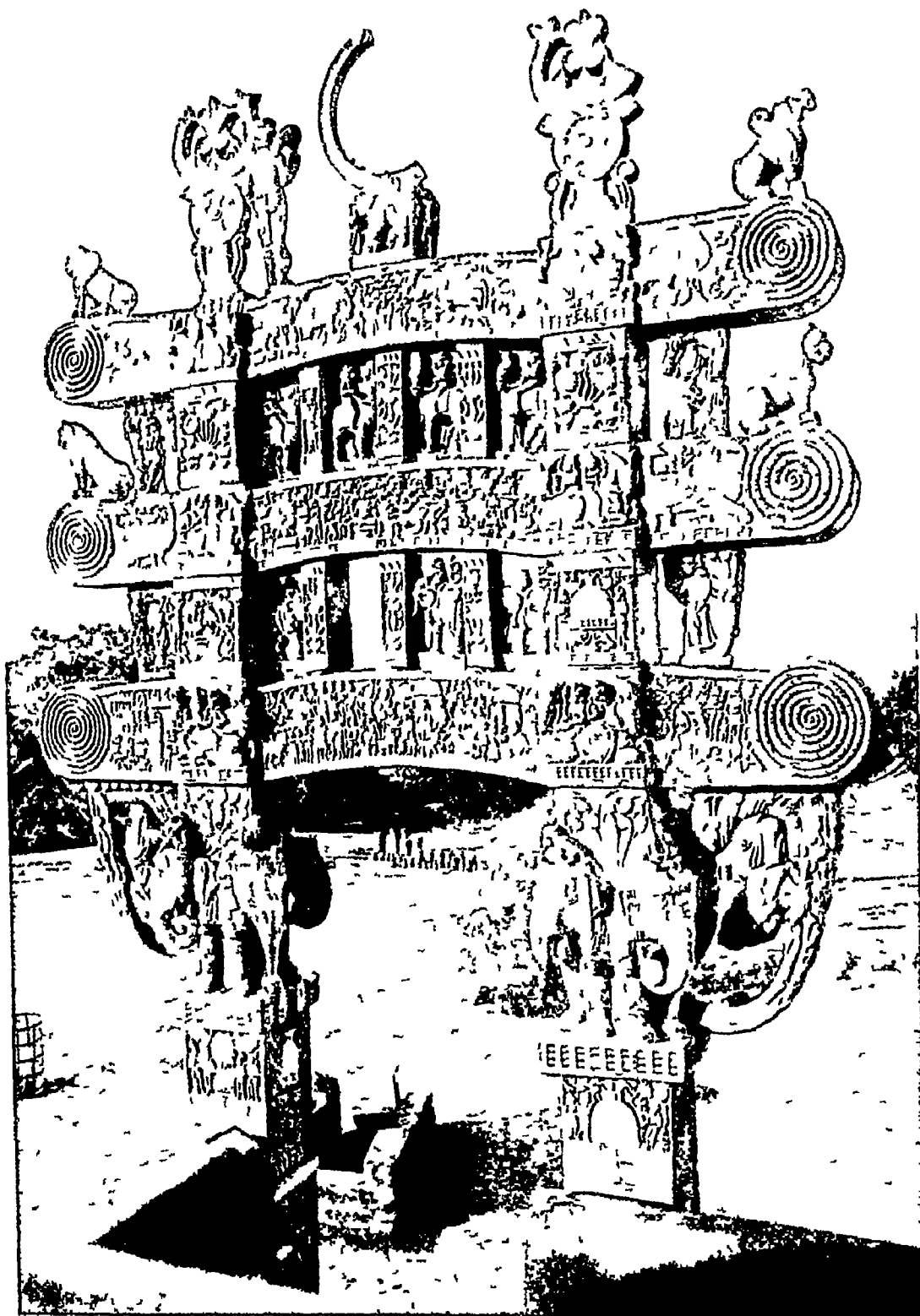
After a series of conversations, Gandhi and the Governor-General agreed that the Indian National Congress would discontinue the passive resistance campaign and take part in a second London round-table conference in 1931. Gandhi himself went to the conference, but negotiations again failed because of the irreconcilable positions taken up by Hindus, Moslems, and other religious groups. The Prime Minister, Mr Ramsay MacDonald, insisted that no constitution could be framed until after a Hindu Moslem agreement was reached. The failure of the conference was the signal for the civil disobedience campaign to reopen. Early in 1932 Gandhi and many other leaders were imprisoned and the Indian government took vigorous steps to repress demonstrations.

Granting of the Constitution

Under these inauspicious circumstances a third round-table conference was held as a result of which a constitution was made ready for submission to Parliament in 1933. After long debates and sessions in committee, in which every clause was carefully scrutinized and in which the greatest political and legal intellects gave their opinions, the Constitution was accepted by Parliament in 1935 and came into force on April 1, 1937.

This constitution of 1935 provided for the federation of 11 self-governing Governor's Provinces and five Chief Commissioner's Provinces in British India and the numerous native Indian states. Burma is not included in the federation but has a separate government. (See Burma) Under the Constitution the Governor-General, known as the Viceroy, appointed by the British Government, exercises the chief executive authority on behalf of the King-Emperor with special responsibilities. He is assisted by an advisory Council of Ministers, responsible to the Federal Legislature. The Legislature consists of two chambers. The members are chosen chiefly by the provincial legislatures and by the rulers of the native states, a small number being appointed directly by the Governor-General. Each province has a local governor and a legislature chosen by the vote of 14 per cent of the population. The native states are ruled by native princes, but are subject in certain respects to Britain.

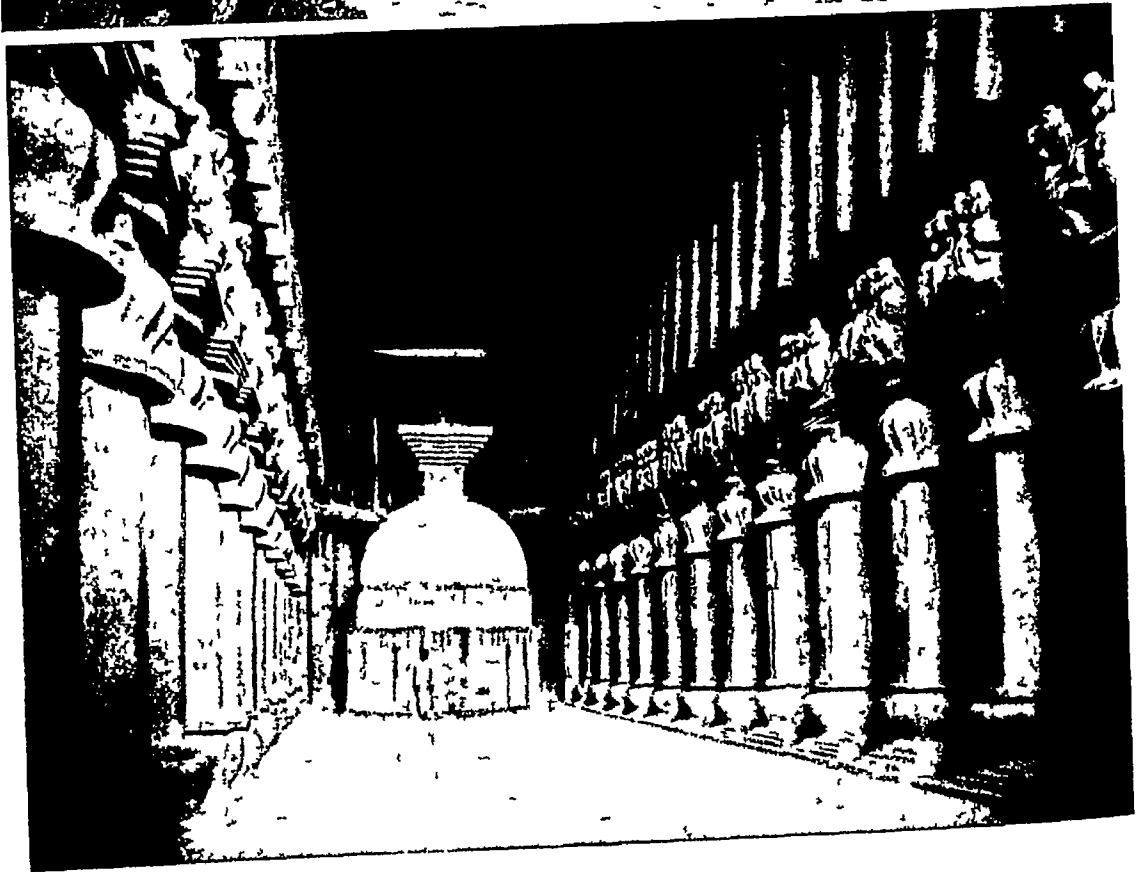
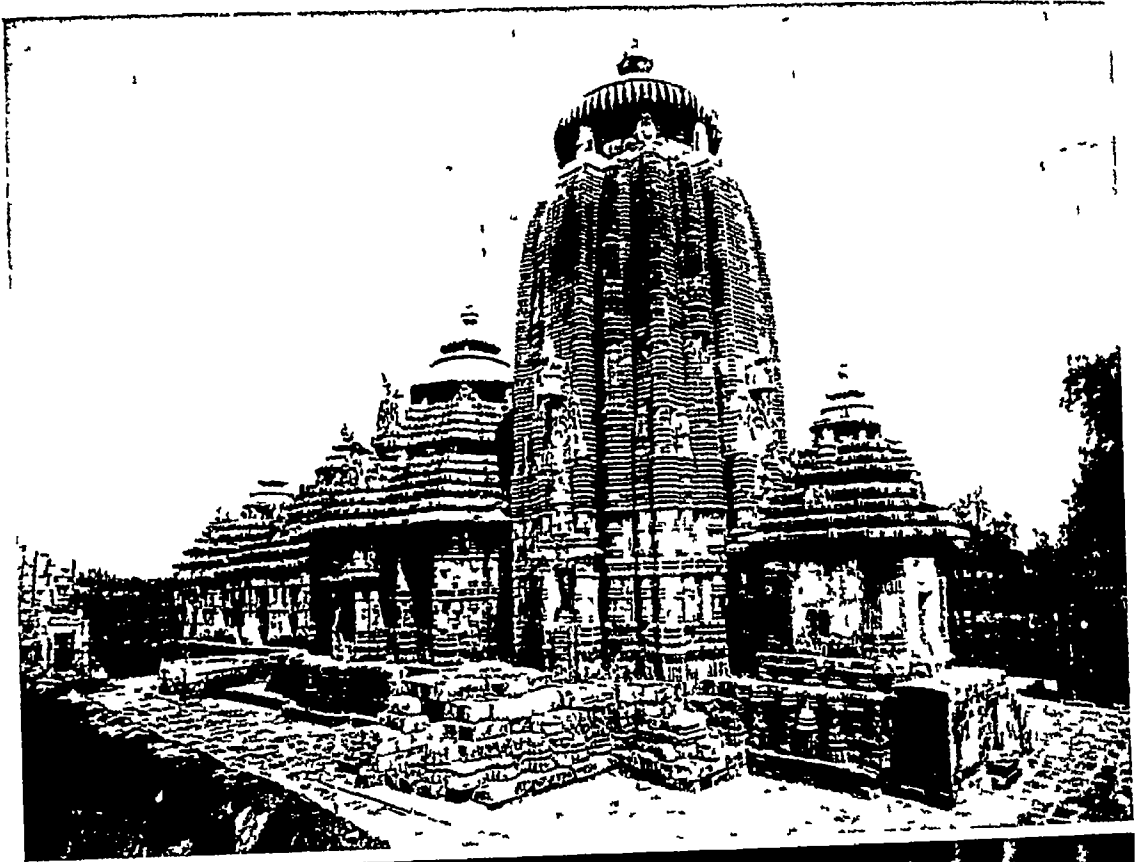
UNIQUE MARVELS OF INDIAN ART



The most famous and perfect of all ancient Buddhist monuments is the great "tope," or temple mound, at Sanchi, in Central India, dating from the 2nd century B.C. The photograph above shows one of its many gateways, ornamented with most complicated carvings. To the devout, every one of these tells a story.

Photo F. Deville Walker

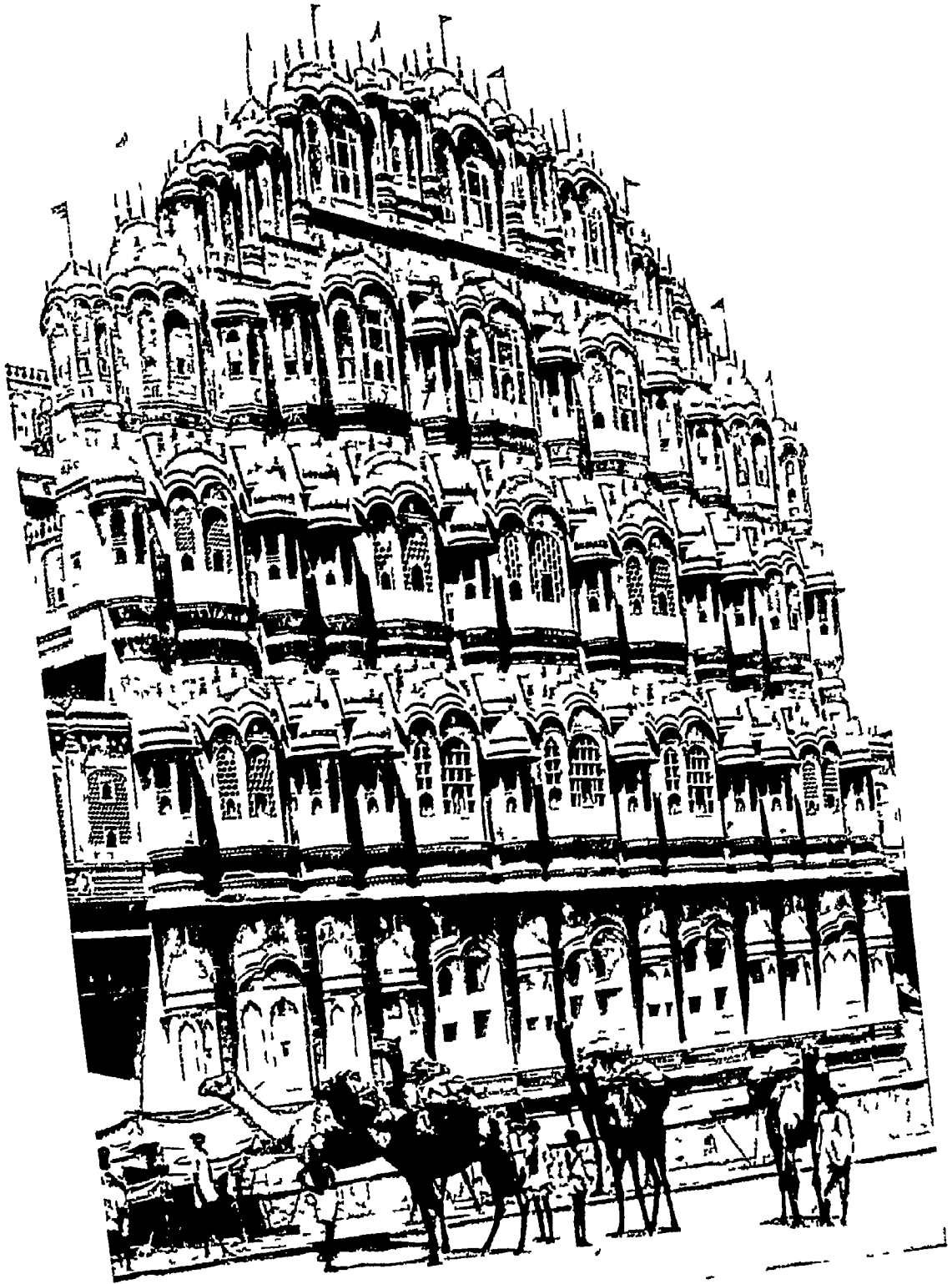
ROCK TEMPLES CARVED BY LONG-DEAD HANDS



The upper temple is in Orissa, and for all its wonderfully intricate exterior, is of an early, and therefore fairly simple design. It belongs to the 9th century. Below is the great temple of Karli, entirely hewn from the solid rock, and still with its original teak roof. It is about 2,000 years old.

Photos top A. de B. Codrington bottom F. Deville Walker

A MODERN MARVEL OF INDIAN ARCHITECTURE



One of the loveliest and most impressive buildings in the whole of India, this "Hall of the Winds" at Jaipur is faced with pink and white stucco. It was built during the 18th century, and thus is a comparatively modern example of Indian architecture, showing well how the native manner continued to thrive in modern times.

ORIENTAL ART OF THE CHISEL AND THE BRUSH



Above is the finest of all Indian animal sculptures, the gigantic 11th-century "War Horse" at Konarak, Orissa. Below are two paintings, on the left, a lady at her toilet from the Ajanta cave-temples. Right, a spirited hunting scene, from a manuscript, showing the Mogul emperor Akbar (16th century)

Photos top K de B Codrington left Indian State Railways right British Museum

INDIA'S CONTRIBUTIONS to CULTURE

There is a distinctive "feeling" about the artistic and literary products of India, which is recognizable at a glance. It emanates perhaps from the Hindu religion, which most great Indian art and writings glorify

India: ARTS AND LETTERS As one might expect of a land whose peoples have for so many centuries been highly civilized, the art and



17th Century Wood Carving can be noted

architecture of India contain numerous memorials of the most impressive size and the highest artistic merit. Some of the earliest are small figures of gods and goddesses which date from 3000 B.C., the 3rd century B.C. gives us many fine religious monuments, and from then until recent times an almost unbroken succession can be noted. A feature of the early architecture of Buddhist and Jainist times is the *stupa*, or *stupa*. This was originally a simple funeral mound, which came to be developed, with walls and all manner of carved erections, gateways and avenues, into almost a museum of contemporary art and, especially sculpture. The *stupa* at Sanchi is one of the finest of such works. One of the most important events in Indian history was the invasion of that great country by Alexander's Greeks, and this has left a permanent mark in the Greco-Buddhist sculpture of which numerous remains have been discovered. The greatest school of this art is the Gandhara, of north-west India. Much of its finest work dates from the 1st century B.C. and the 1st A.D., from which period, too, date some of the amazing rock cut shrines and monasteries. Some of these, such as the famous one at Karli, are lined with pillars and intricate sculptures hewn from the solid walls. After them came the Gupta period, with monuments alike of Buddhist and Hindu art in brick and stone. Some of these are weird and wonderful and have a beauty relying on forms completely foreign to those devised in any other part of the world. At this time too the famous Ajanta cave temples were excavated as remarkable for the paintings which adorn their walls as for their sculpture. Throughout all its long development this Indian architecture and the sculpture and painting which went with it grew more complicated as our illustrations show.

From the 10th to the 13th centuries "shorter" in times were invading India and in the northern part especially they have left

their mark. Among the peoples whom they drove from their original homes were the Rajput races. To the Rajputs we owe the lovely miniature paintings which are India's chief contribution to illustrative art. The finest of these were done in the 17th and 18th centuries, and in those times, too, much very fine wood-carving and metal-work was carried out. Moreover, their truly Indian style still exists, for all over the great country there are to be found traditional workers in metal and stone, who, when European influence is not at work, still build and decorate their temples in the same manner as has been used for hundreds of years. This Rajput tradition has survived especially in southern India, while in Bengal efforts have been made to preserve an Indian pictorial art which shall be entirely free from western influences.

To the Mahomedans, however, India does owe one of its greatest periods, both in architecture and in painting, and that is the period of the Moguls. It was one of them, Shah Jehan, who had erected in the 17th century India's most glorious building of all, considered by many people to be the loveliest in the world—the magnificent Taj Mahal (q.v.) at Agra.



SIVA DANCING: AN INDIAN BRONZE

The great god Shiva in one or other of his numerous forms is the most popular of all subjects for Indian artists and he is seen dancing on the body of the demon Tripura Sura. The movement and liveliness of this lovely bronze figure make real to the world the fierce armed form of the Hindu god.

INDIA: ARTS & LETTERS

There has always been a vast production in India of the "art of the people," the instinctive art of the village potter, the weaver and maker of coloured textiles. In all of these is the Indian spirit, and in many of them there is as great beauty as that in the more highly organized work. Moreover, Indian art extends far outside its own country, all over the East Indies and through the adjoining lands. In Ceylon, Siam, Indo-China and Burma, the architecture especially is much the same as that found on the Indian mainland.

Ancient Literature of India

The earliest Hindu literature consists of the Vedic hymns, of which the "Rig-Veda" is the most ancient collection. This consists of 1,017 short poems, giving a definite picture of a high

of the familiar nursery stories that have charmed the children of England and America.

Under the influence of modern education many Hindu writers are developing a new and interesting national literature. Most conspicuous among these is Sir Rabindranath Tagore (born 1861), who has attempted to embody in his poems, tales, parables, and dramas the advanced ideas of European civilization, while keeping the best traditions of ancient Hindu idealism. In 1913 this eminent Hindu writer was awarded the Nobel prize for literature, and in 1915 he was knighted, but later renounced this honour for political reasons. Among his well-known works are "The Crescent Moon Child Poems," "The Gardener," "Gora," a novel, and "The Religion of Man."

Indian music is peculiar to Western ears in that it contains no harmony. It is made up of melody and rhythm only. There is no accompaniment to the melody as in Western music. No two different tones are sounded at the same time. Several instruments are rarely used together, and when they are they play in unison. Songs, which are of the greatest importance in Indian life, are sung in unison also. Among instruments, drums and flutes are favoured. There are also many varieties of



GREEK INFLUENCE IN INDIAN SCULPTURE

The relief seen above is a typical example of the Graeco-Buddhist sculpture of the Gandhara school. It shows Buddha being attacked and tempted by the prince of demons, Mara. In the figures, and the clothing, especially, the Greek influence, dating from the conquests of Alexander, is noticeable, and it needs no expert eye to see that there is a good deal of western feeling in this work. It is, too, much simpler than purely oriental sculpture.

British Museum photo Mansell

civilization existing about the time the Aryan invaders had reached about the banks of the Indus and were fighting the "dark people" of the south. To the Vedic poems were attached prose works called "Brahmanas," explaining the duties of the priests, then were added the "Sutras," telling of laws and ceremonies, and later the "Upamishads," treating of God and the soul, the "Aranyakas," giving directions for leading a holy life, and finally the "Puranas," or sacred traditions.

During the period from the 1st to the 8th century A.D. were composed a number of Sanskrit epics and dramas filled with adventure and romance. The old Hindu fables of animals, which were translated into the Persian as early as the 6th century A.D. and so found their way into Europe, are said to be the basis of many

stringed instruments, some of ancient origin.

There is in India a great revival of interest in science also. Centuries ago Hindu astronomers and mathematicians were highly honoured, and contributed an important share to the development of knowledge. They exchanged ideas with the Greeks at the time of Alexander's conquest, and in the 9th century important Hindu scientific works were translated by the Arabs and so reached Europe, but with the advent of the Mahomedans science declined, and it has remained for the universities of Calcutta, Madras, Bombay, Allahabad, the Punjab, Patna, Nagpur, Andhra, Agra, Rangoon, Lucknow, Dacca, Annamalai and Delhi, and then large number of affiliated colleges to bring back the traditional love of learning to the Indian youth. There is a Hindu Uni-

versity at Benares and a Mahomedan University at Aligarh. Large numbers of Indian students come to Britain to enter there the great seats of learning. (See also the separate articles on India's chief provinces and cities)

Indiana. This State of the U S A (36,350 sq miles in extent) lies in the central region south of Lake Michigan. It is mostly agricultural in character, the surface being a flat, fertile tableland. Indianapolis (population 364,000) is the capital and largest city. It is a "planned" city set in the exact centre of the State. Features of interest include the magnificent domed State House, the Soldiers' and Sailors' Monument, and the adjacent track for racing cars. Other cities are Fort Wayne, South Bend, Evansville, and Gary—the centre of the State's steel industry. Indiana, the population of which totals 3,238,000, is nicknamed the "Hoosier State."

Indian Ocean. Two thousand years ago, when mariners were still venturing only on the most cautious coastal voyages along the Atlantic coast, the Indian Ocean could already boast established trade routes, and Alexandrian Greeks boldly made their way across the open sea between Arabia and Hindustan though they possessed neither chart nor compass. They had nothing to fear if they avoided the hurricane months from December to April, for they had observed that the monsoon winds blow nearly half the year in one direction, and the rest of the year in the opposite.

Washing the shores of Asia on the north, Africa on the west, and the East Indian islands, Australia, and Tasmania on the east, the Indian Ocean is the third largest of the oceans.

Its length from north to south is somewhat over 6,500 miles, its breadth 4,000 to 6,000 miles, and its area about 28,000,000 sq miles. The average depth is over 2,000 fathoms, the deepest sounding so far being 20,340 feet off the south east coast of Java.

At Cape Comorin, the southern tip of India, the Indian Ocean forks into the Bay of Bengal on the east and into the Arabian Sea on the west, the latter branching again into the Persian Gulf. Beyond the Arabian peninsula it connects with the Red Sea. From Asia several great rivers enter it—the Ganges, the Brahmaputra, the Irrawaddy and the Indus, and from Africa the Zambezi and the Limpopo. Its great islands are Madagascar, Sumatra, Java, Borneo and Ceylon, the rest being mostly small groups.

India Office. Until the Indian Mutiny of 1857, India was governed from London by the Honourable East India Company and the Governor General and all his subordinates were appointed by the Company, which also controlled the Indian Army. After the Mutiny the control of the government was transferred

to the British Crown and the India Office was established. It consisted originally of a Secretary of State assisted by an advisory council of not more than twelve or less than eight members. At least half the number must have held office under the Crown in India for not less than ten years, and the period of such service must have terminated within two years of their being appointed to the Council.

When Federation was established in 1937 the Council ceased to exist, its functions being largely assumed by a body of advisers. The task of the India Office is to co-operate with the Viceroy in guiding India towards self-government. Since Burma ceased (in 1937) to be a province of the Indian Empire a separate department has dealt with its affairs.

Indigo. For centuries the much prized blue dye called indigo was obtained exclusively from the indigo plant, and the indigo trade with India and other centres of production was flourishing and prosperous. Today the natural indigo trade has dwindled to a fraction of its former importance as a result of the discovery of ways to make artificial indigo.

The story of artificial indigo is one of the most interesting in the history of chemistry. It took 17 years of tireless experiment and the expenditure of a vast sum of money to perfect the process. As early as 1880, a German chemist, Adolph Baeyer, produced synthetic indigo from coal-tar products, but the cost of production was much greater than that of the natural dye. From then until 1897 he and others worked on the problem of making indigo by less expensive processes, finally succeeding in producing it at less than half the cost of the plant dye. (See Dyes)

Vegetable indigo is obtained from a shrubby plant 3 to 5 feet high, with rounded leaves and pale red flowers, belonging to the bean family. When three months old and in blossom, the plants are cut down, but soon shoot up again, and yield a second and often a third cutting in one year. The cut stems and leaves are crushed and soaked in water for several hours. Fermentation takes place. Then the water, which is clear yellow, is run off into another vat and stirred. Indigo begins to form in flakes on contact with the air, and settles to the bottom.

The best quality comes from Bengal. Indigo plants are also grown in Java, China, Ceylon, Mexico, Brazil, and Central America. The scientific name of the Bengal indigo plant is *Indigofera sumatrana*.

Indo-China. "Further India," or "Indo China"—the great projection which forms the south eastern corner of Asia—looks on a political map somewhat like a flower with three petals, supported on the slender stem of

INDO-CHINA

the Malay Peninsula. The western petal is Burma. In the centre is Siam, which alone of the group retains its ancient independence, and French Indo-China in the east forms the third division. Siam also includes the upper part of the "stem," in the lower portion of which are the Federated Malay States, under the protection of Great Britain, and the Straits Settlements, a British colony. (See also the articles on Burma, Malaya, Siam)

Situated between India and China, Indo-China has something of the nature of each of these two great countries of south-eastern Asia. The people, originally of Chinese stock, have derived their religion and much of their language from the Hindus, and are really a mixture of both races. The more primitive Malays, who inhabit the narrow peninsula, have also had their share in creating the complex physical and social characteristics of the Indo-Chinese race.

French Indo-China consists of five provinces: Tongking, Annam, Cochinchina, Laos and Cambodia (the last-named is the subject of a separate article). The total area of the provinces is 285,000 sq miles and the population is just over 21,000,000, the Europeans numbering fewer than 50,000. At least 80 per cent of the population are Annamese. They are shorter than the Chinese and darker. The Annamese has a low forehead and a flattish nose. He is peace-loving and more industrious than the wilder Lao, who lives in the mountains, but is not so hard working or inventive as the Chinese, who has largely influenced his written and spoken language. His religion is a rather vague sort of Buddhism mixed with ancestor worship. His dress consists of wide trousers, a long black tunic, a coloured turban or straw hat, and sandals.

His house is just a one-room affair, with a veranda in front where the altar to his ancestors stands. In the daytime it has only three walls, but at night a bamboo partition let down from the roof shuts out a little of the night dampness

of this semi-tropical climate. He grows two crops of rice a year, a little tea and tobacco, and mines some gold and tin in the hills. In the forests he gathers saps which give him the pretty colours of his native cloths, tree fibre from which he makes paper, and herbs and roots which, with fish and rice, make up most of his daily ration.

The climate of Indo-China varies according to the height of the land. The highlands are

relatively cool and the low lands experience tropical heat, while in the densely-wooded areas there is an intermediate temperature.

Cochinchina alone of the five states enjoys the full rights of a French colony and sends a deputy to the Chamber in Paris. The other states are protectorates, but Annam and Cambodia have kings, though both countries are virtually ruled by the French resident. The area of Cochinchina is 26,476 sq miles and the population is about 4,500,000, of whom about 17,000 are French. There is a French garrison of about 3,000 men. The chief crop is rice, but maize, beans, sweet potatoes, cotton, rubber, sugar cane, tobacco, coffee, oranges and bananas are also grown. There are extensive river and coast fisheries and over 19,000 tons of salted and dried fish are exported annually to neighbouring countries. Saigon, on the river of the same name, about 40 miles from the sea, is the capital and chief port, and has a population of nearly 150,000. Often called the "pearl" of Eastern cities, Saigon, laid out on the plans of Paris as it was 150 years ago, is a beautiful city

with broad boulevards, public squares (places), churches, cathedral, and an opera house.

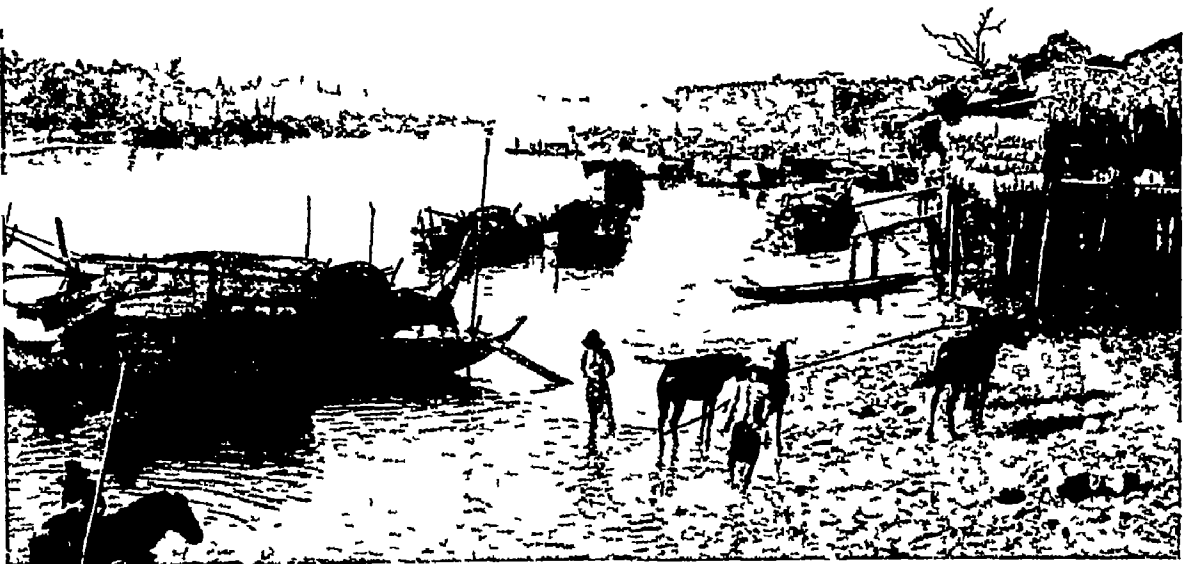
Annam has an area of 39,758 sq miles with a population of just over 5,000,000. The capital, Hué, has a population of about 33,000. Rice is the most important product and other crops are cotton, maize, areca nut, tobacco, manioc and bamboo. Cattle rearing is also carried on.

Tongking has an area of 40,530 sq miles and a population of nearly 9,000,000. The capital,



GIRL OF INDO CHINA

Five-sixths of the people of French Indo-China are Annamese, a dark-skinned, good-looking people. Indoors the women wear this costume of loose trousers and a square fichu which leaves the back and arms bare.



COMMERCIAL CAPITAL OF FRENCH INDO CHINA

The town of Saigon which is the chief commercial city of French Indo-China and capital of Cochinchina is situated on the Saigon river, about 40 miles from the South China Sea. It is also the chief French military and naval base. The centre of the city is well laid out and has some fine buildings, but on the banks of the river are squalid native houses like these raised on piles to put them above the flood waters. Equally primitive are the native boats with rough shelters amidships.

Hanoi, with a population of about 130,000, is a fine modern city and in 1902 it became the capital of French Indo China instead of Saigon.

Both these towns are connected with France by a regular air service. Maize, sugar-cane, and tobacco are produced as well as a large quantity of silk. Haiphong or Hai Phong is the chief port and naval station of Tongking. There are valuable limestone quarries, calamine and tin mines, and large deposits of hard coal.

Laos has an area of 89,320 sq miles and population of close on 1,000,000. Cotton, indigo and tobacco are produced, and there are valuable forests of teak.

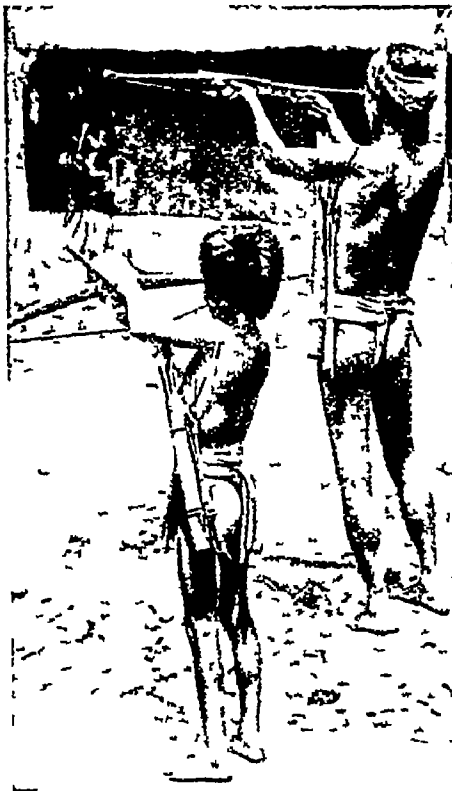
Indo China has abundant wild life. There are many elephants, including the so-called white elephant, though it is really grey. There are rhinoceroses, bears, tigers, leopards and panthers. Many varieties of monkeys are to be found in the forests and there are vast numbers of birds including storks, cranes, peacocks and guinea fowl. Snakes are numerous and many varieties are poisonous. The Mekong river has an

abundance of fish and is also the home of huge alligators, so is the Red River. In all Indo-China there are only 1,700 miles of rail-

ways, but there are over 6,000 miles of good roads and its great waterways are equally valuable.

Indus, RIVER Glacier-born amid the wind swept wastes of Tibet, this mighty river of India rushes for the first 500 miles of its 2,000-mile journey through an array of majestic Himalayan peaks of unequalled grandeur. After flowing north-westwardly through Kashmir, it bends to the south-west, and presently emerges into the great Indian plain of the Punjab, the "land of the five rivers," which the Indus and its tributaries water abundantly.

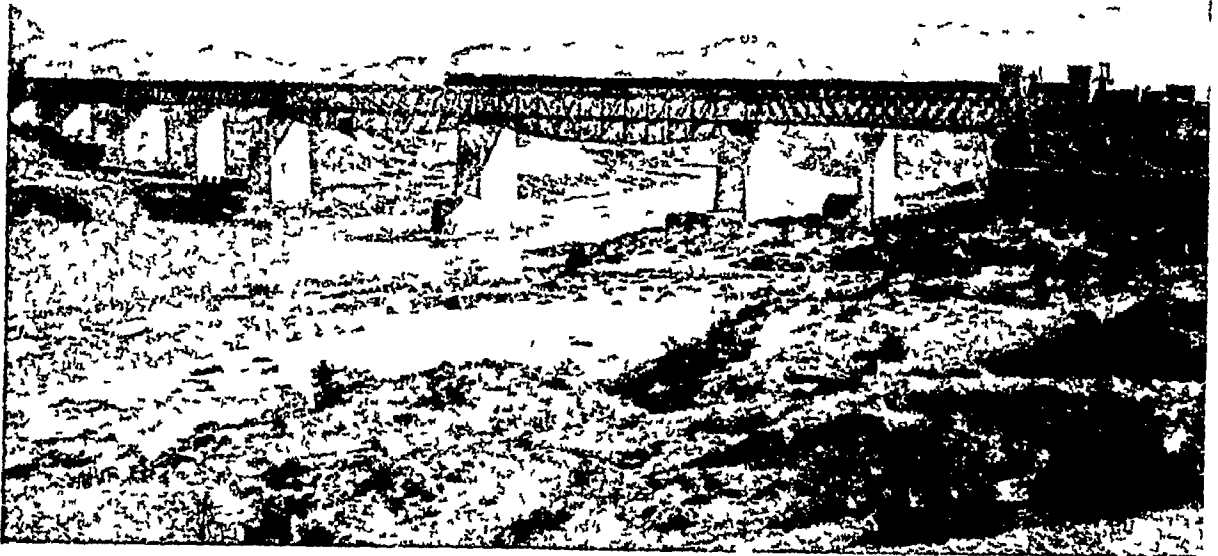
The united flood of the six rivers now sweeps on through the Sind plain—a region which is the creation of the Indus, as Egypt is the creation of the Nile. The climate here is almost rainless, but, thanks to the annual inundation of the great river, when the melting snows of the Himalayas cause it to burst its banks and to flow into



FIRST LESSONS IN ARCHERY

The Mois are a tribe of Indo-China who lead a nomadic life and get their food by hunting. This small boy is having a lesson in shooting with a bow and arrow so that later on he may do his share in providing the family's dinner.

Photo Mme Vassal



TWO BRIDGES IN ONE ACROSS THE INDUS

This wonderful new bridge, with a railway track above the road, crosses the river Indus at Attock, it was built to replace the one which was washed away in the floods of 1929. Because this is a very important bridge, from a military point of view both ends have strongly fortified gates, garrisoned with troops from Attock. The railway runs from Lahore and Rawalpindi to Peshawar, and the bridge is the great link between the Punjab and the Khyber Pass. The river is here about two hundred yards wide.

an intricate network of canals, all this region produces abundant crops of cotton, millet, rice, and wheat.

Even the soil is the gift of the river, which carries the fine sand and clay of its upper course to the Sind plain and deposits the rich silt there as it slackens its impetuous course. So abundant is this accumulation that the Indus has raised its bed 70 feet above the level of the plain at its border 50 miles away. To improve cultivation in the Indus basin, vast schemes of irrigation have been undertaken. The Lloyd Barrage at Sukkur, one of the world's greatest engineering wonders, waters about 8,000 sq miles that were once dry and barren. As soon as this vast tract is in full productivity, facilities are available to increase the area, by a system of interlocking canals, almost indefinitely (See Irrigation).

In the lower part of its course, except where it runs between walls of rock, the river continually shifts its bed, especially in the 130-mile delta, through which it finds outlet to the Indian Ocean by means of a great number of little channels. Hence there is little navigation, except by the high-sterned, flat, native boats. The river Indus abounds in fish, and crocodiles and alligators infest most of the lower reaches. Many bridges of all types cross the river, from modern steel suspension railway bridges to the primitive swaying rope and vine bridges of the mountain regions.

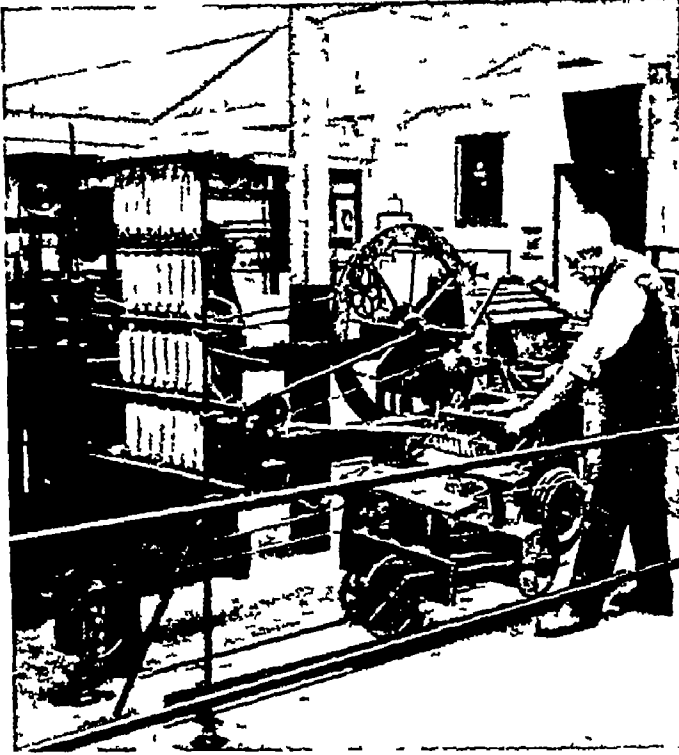
Industrial Revolution. Until about 1750 the world carried on its daily work in much the same way as it had done for more than 2,000 years, and a contemporary of Pericles would have had little difficulty in making himself at home in the England of George III. Ploughs were still clumsy wooden affairs that did little more than scratch the ground, reaping was done by hand with sickles and scythes, jointed sticks called "flails" were used for threshing the grain. The tools of the carpenter, smith and mason resembled those shown on the old Egyptian monuments, and except for the hand- or foot-driven spinning-wheel, spinning and weaving showed little progress since the Homeric days when Penelope wove her web.

We may sum it all up by saying that there were no *machines* before 1750, such as now perform most of Man's work for him and place at the disposal of everyone goods which only the wealthy could formerly buy. On the other hand, there were no smoke blackened factory towns with their squalor and desolation, and problems of unemployment, of capital and labour were few or none at all.

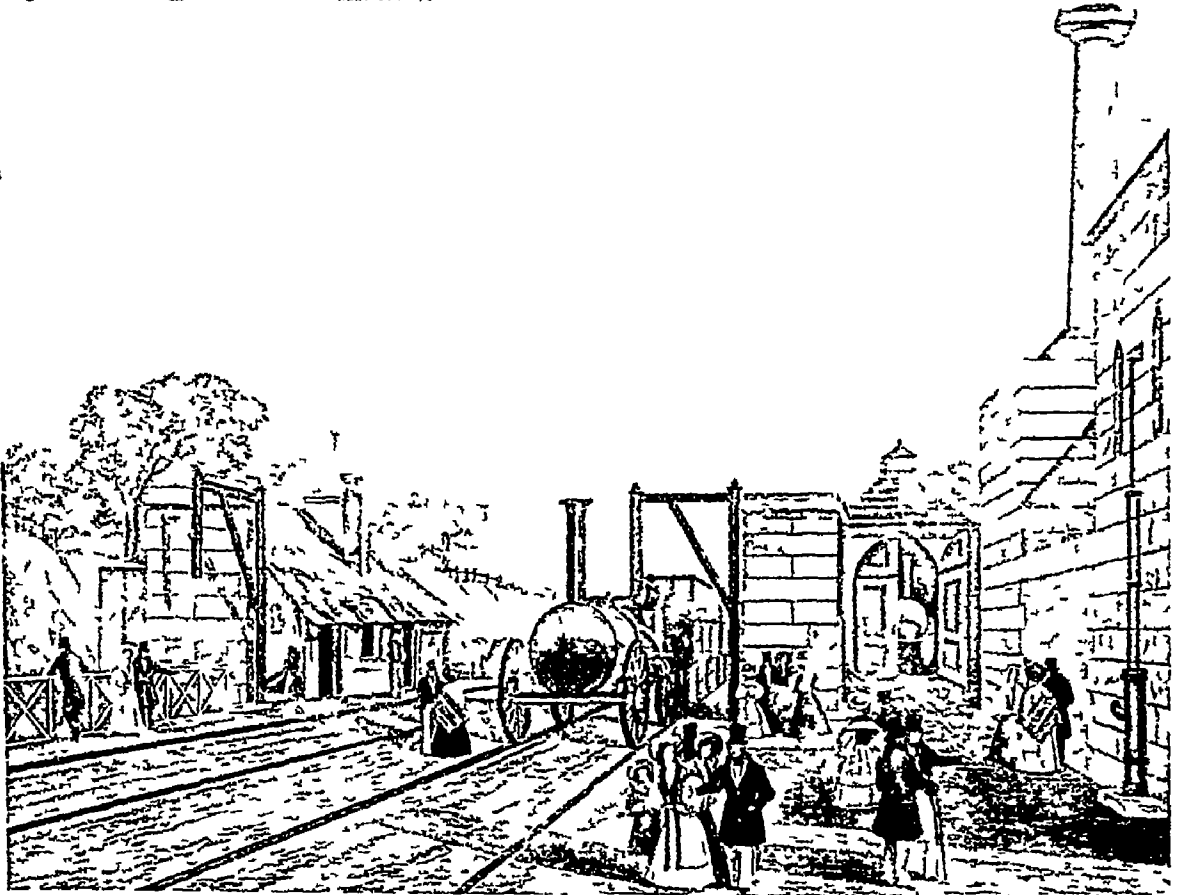
It is to the revolutionary changes which, within less than a hundred years, wiped out this age-long condition of affairs and brought about the throbbing, pressing machine age of today that we give the name "Industrial Revolution."

The movement began first in Great Britain, and it has gradually spread over the world. In

FIRST STEPS IN THE INDUSTRIAL REVOLUTION



One of the most important of the inventions that brought about the Industrial Revolution was that of the spinning mule (left) by Samuel Crompton in 1779. Above are two of the first blast furnaces that used coal to make iron. They were erected by Samuel Darby at Coalbrookdale in 1709.



A great impetus was given to the Industrial Revolution by the invention of the steam locomotive and the construction of railways. It was now possible to move heavy goods far more easily and quickly than had been the case when canals and horse-drawn waggons were the only means of transport, and coal could now be carried from the pits to the factories with an ease hitherto impossible. The illustration above is a drawing of the Liverpool and Manchester Railway as it was in 1833, three years after the opening. It shows an engine taking in water at Parkside Station. It was at this station that William Huskisson, M.P. for Liverpool, was run over by the engine and killed on the day the railway was opened.

INDUSTRIAL WELFARE

agriculture it came first with better tools and methods of cultivation, particularly the growing of root-crops—turnips and beets—in rotation with grain. Breeds of cattle and sheep were improved, and draining and fertilization made the land more productive and capable of supporting a larger population (See Agriculture). At the same time roads were improved and canals were built for transporting heavy goods.

Then about 1750 began the great movement made possible by the new machines for spinning and weaving. These brought the factory system and the application of water- and steam-power to manufacturing, with the long train of inventions which made the steam-engine more and more efficient, until it became the thundering locomotive dragging its train at 60 miles an hour across continents only a few score years removed from savagery. And machine has followed machine, of ever growing wonder and complexity, until now it is calculated that in the textile industries alone the work of those non-human slaves who serve us equals that of 50 billion persons working with the old hand-tools!

Production has thus increased enormously, and with it population in the areas where industry has found a home. No period since the world began has seen changes which can begin to compare in importance with these. Is it any wonder, then, that competent historians have called the Industrial Revolution "the greatest single event in the world's history"? (See also Inventions, and articles on Arkwright, Sir R., Crompton, Samuel, Hargreaves, James, Watt, James)

Industrial Welfare. This century has seen an immense improvement in the conditions under which manual workers perform their tasks. That is because employers now realize that happy and healthy "hands" working in pleasant conditions make for bigger production and smoother working in the factory.

The deep interest taken by King George VI, as Duke of York, in industrial welfare gave a great impetus to the movement, and his Majesty is Patron of the Industrial Welfare Society, which was founded in 1918. On its council are representatives of both employers and employees.

A special concern of the Industrial Welfare Society is to secure the best conditions for young workers. Allied to it is the Institute of Industrial Psychology, whose experts periodically visit works and factories to inspect and report on working methods and conditions. The value of this body to employers and employees alike may best be illustrated by the following example. At one mass production factory the experts found that the stools on which the operatives worked were too high for comfort and speedy manipulation, causing the workers to tire quickly. Their suggestion that the stools be lowered two inches was acted upon, with the

result that fatigue was abolished and production increased, wages were raised correspondingly, and both parties satisfied.

There are more than a million boys and some 800,000 girls between the ages of 14 and 18 in occupations included under the Unemployment Insurance scheme. About a quarter of them, in each case, are in the distributive trades, which employ a far larger number both of boys and girls than any other single trade. Next in order of importance are, for boys, the industries of coal-mining, building, and general engineering, for girls, tailoring, laundry and the cotton industry.

Protection of Working Children

For more than a hundred years young workers in industry in this country have received special protection by law. The Factories Act of 1937 limits their working hours to 48 a week (subject to allowances for overtime and other exceptions) from July, 1938, and for those under 16 the limit from July, 1939, is 44 hours a week. The Shops Act of 1934 also fixes a maximum of 48 hours for the young persons covered by it. Boys and girls entering industry are medically examined by the factory surgeons, and their employment in certain dangerous processes is prohibited.

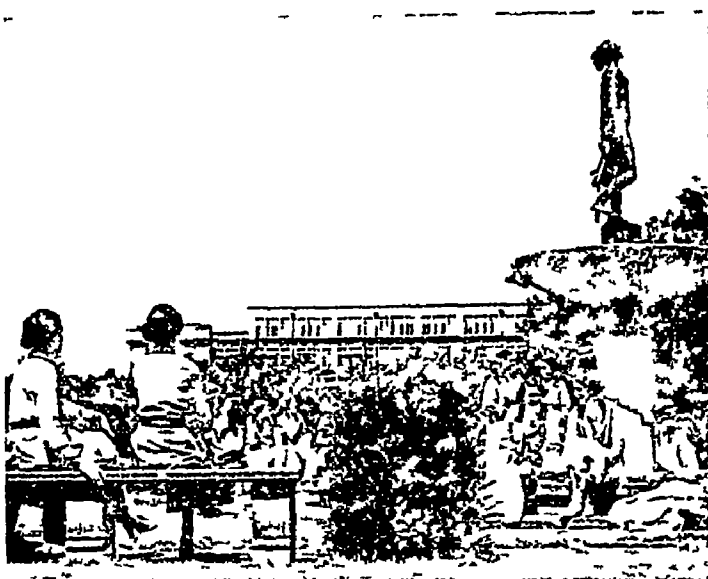
Within this framework of legal protection much remains to be done to safeguard the welfare of the young worker. Some of the tasks, such as the provision of health services and continued education, belong to the State, others are undertaken by the community through voluntary agencies, but in matters of health and safety at work, training, security of employment on reaching adult age, help in making the difficult mental and physical adjustments to factory life, responsibility falls on industry.

Child Welfare in the Factory

Long before the World War a few enlightened firms had established welfare schemes in which provision for young employees played an important part. The movement grew very rapidly during the War when large numbers of boys and girls were brought in to help carry on the country's industry in the emergency, and it has continued to make progress since. There are now many hundreds of firms which concern themselves with the welfare of their young employees in some way or another.

The employment of a full-time welfare supervisor in the factory, who is responsible for engaging the boys and girls and introducing them to their work, and who is ready to give them friendly advice, in consultation with their parents, about their training and further education, is the first and simplest method.

Medical, dental and first aid services are provided in connexion with the factory. In the works canteen, good meals are provided for a very small charge to young employees, and milk may be supplied to them free or below



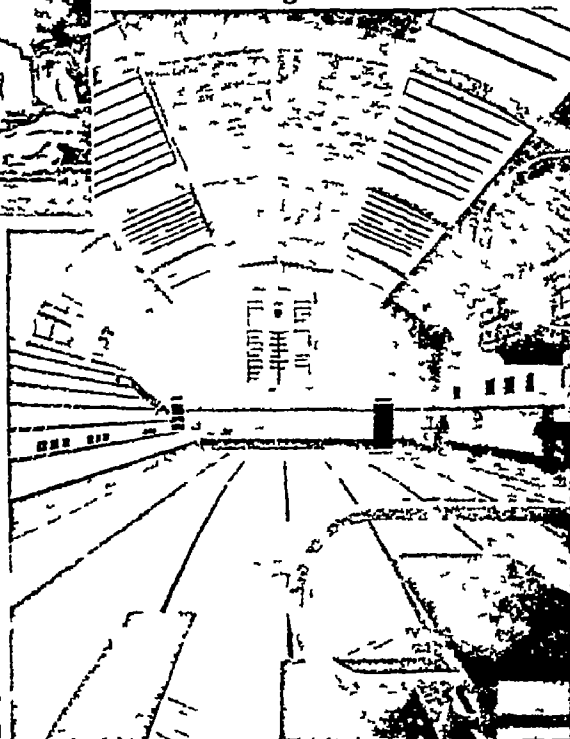
cost Attention is paid to the protection of young workers from accidents, to which they are specially liable during the first few months of their employment

Training and "initiation" schools are held at the factory, or alternatively encouragement is given to boys and girls to attend evening classes, by allowing them to leave work early, by prizes for good attendance, and by advice on the choice of courses

Boys' and girls' clubs, scout and guide troops, etc., are run in connection with the factory, or where the community is small the firm may support local organizations Opportunities are provided for physical training, swimming,

outdoor and indoor games, handicrafts, hobbies, music and drama Holiday camps and tours are arranged and partly paid for by the firm

In these and similar ways employers are accepting responsibility for the training, leisure, and welfare of their young workers Such voluntary action cannot solve all the problems of juvenile employment, but in its own sphere it is making a valuable contribution to social well-being



Architect of above A J Saise, A.R.I.B.A.
Supervising Architect J H Forshaw F.R.I.B.A.



THESE MAKE FOR HAPPY WORKERS

In the top photograph neatly-overallsed girl workers at Bournville are seen sunning themselves at the edge of the recreation ground beside Cadbury Bros' works. The factory where they work is in the background The middle picture (reproduced by permission of H.M. Stationery Office) shows the fine modern swimming bath built by the Miners' Welfare Committee at the Sherwood Colliery Notts for the benefit of the miners. The Joseph Rowntree Memorial Library (bottom picture) looks so homely and restful that it is hard to believe that it is part of the Rowntree cocoa works in York.

Inferiority Complex How often do we hear it said of someone that he or she has an "inferiority complex"! The man who invented and popularized the term was Alfred Adler (1870-1937), an Austrian physician who in his younger days studied under Dr Sigmund Freud, founder of the movement and school of psychology called Psycho-analysis (See Psycho-analysis) At first Adler was strongly attracted by Freud's theories, but in course of time he came to the conclusion that Freud laid far too much emphasis on the sex element in the human make-up He himself thought that not sex but the "will to power" is the principal motive force in human life

According to Adler, nervous diseases have their origin in organic defects, or other disabilities, and persons suffering in this way tend to possess feelings of inferiority or handicap which they try

to surmount A boy who is naturally shy, for instance, feels keenly the disability, and in his determination to conquer it often becomes very pushful, and sometimes even noticeably aggressive towards others

From this Adler proceeded to frame the theory that the motive of neurotics, i.e., persons suffering very badly from "nerves," is a striving towards masculinity This he called the "masculine protest," though it may be experienced by women as well as by men

Adler's school of teaching is called Individual Psychology, and some of his ideas have been widely accepted In Vienna clinics for child care and child guidance—the first in Europe—were established in accordance with his teaching, but these were suppressed after the fall of the Socialist régime in 1931 and he passed his last years abroad He collapsed and died in the street at Aberdeen, where he had come to deliver some lectures

Ink. If the ink runs smooth and free from your pen, sinks into the paper without spreading, and leaves a blue-black mark that becomes deeper and deeper in colour even if it is exposed to the sun's rays, it is probable that it was made of nut-galls, from which, for centuries past, the best grades of ink have been made

The nut galls used are growths of a species of oak found in Asia Minor The gall-fly, a small wasp like insect, burrows into the soft twigs and deposits her eggs The tree throws protective tissues over the spot until a lump, sometimes nearly an inch in diameter, is formed These lumps, or galls, contain a large amount of tannin, the substance which makes them so valuable for ink making

Solutions of the galls and an iron salt, usually green vitriol (ferrous sulphate), are mixed, and a chemical change occurs, forming the colour A thickening substance, often a mucilage known as gum-senegal, holds this colour suspended in solution Small quantities of various acids keep the ink from coagulating and moulding Often other colouring agents are added to make the writing darker in colour at first

If you are using an inferior grade of ink, it may have been made of logwood from the West Indies, or by mixing green vitriol with other tannin solutions Such inks, while they may be satisfactory at first, fade after a few years Some ancient documents written with ink made of galls are as bright and clear today as when they were written, centuries ago

If you are writing with a special fountain pen ink, it was probably made from the black aniline dye nigrosine This ink never thickens and forms no sediment, so that it is peculiarly adapted to the fountain pen, although the colour is not so permanent All colours of ink can be made with aniline dyes

Red ink is sometimes coloured with the powdered bodies of thousands of tiny red insects called cochineal, brushed from the cactus in Mexico, Central America, and Peru Most red ink is made from brazilwood, imported from Central and South America, while not producing such a brilliant scarlet as cochineal, this ink fades less quickly

How to Make 'Invisible Ink'

Then there are the secret or "sympathetic" inks, which leave no visible mark on the paper when they are used Many important papers have slipped past an enemy's eyes by this means, to reveal their messages when they have reached their destinations Some of the favourite secret inks are lead acetate solution, whose invisible marks turn black upon exposure to sulphuretted hydrogen, cobalt nitrate solution, which turns blue when it is treated with oxalic acid, and cobalt chloride or nitro chloride, which becomes green when heated During the Indian Mutiny letters and orders were sometimes written with rice-water, to be developed later with iodine A clean pen dipped in lemon juice will produce writing which is invisible when dry, but which stands out sharply in brown when the paper is heated

Artists use Indian ink This is an early form of ink invented in China 1,200 years before the Christian era, and the best qualities are still made in China and Japan Lamp black, made from sesamum oil, is mixed into a paste with a glue made from skins of asses or oxen, and then pressed into sticks or moulds

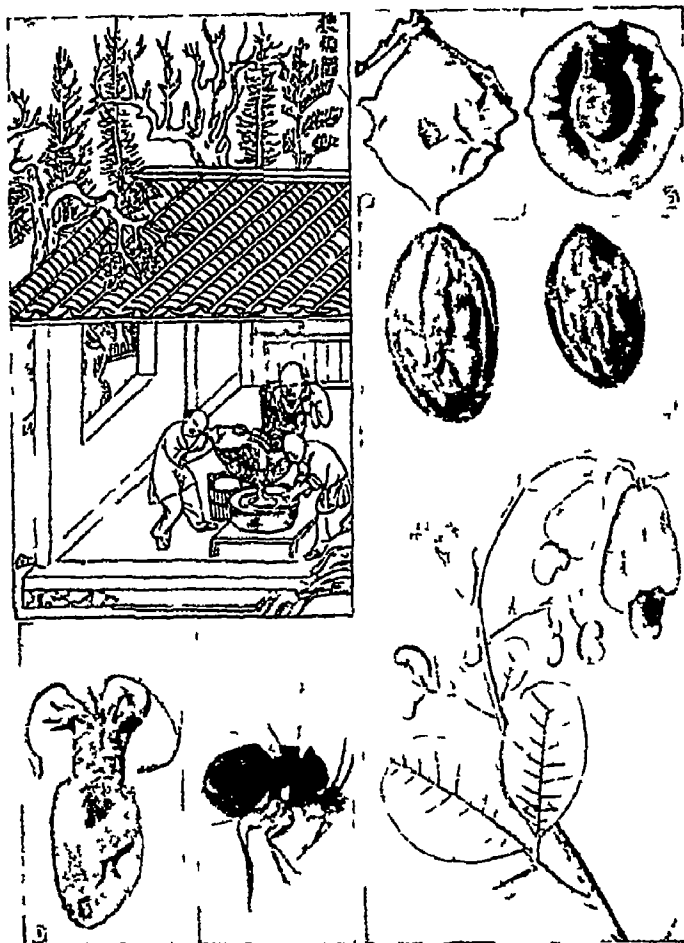
The most interesting ink of all, perhaps, is sepia, obtained from the cuttle-fish or squid This most uncanny of sea creatures has on the under side of its body a gland containing a deep brown fluid, which it can throw out at will to conceal its escape when it is alarmed Sepia ink is the most lasting of natural inks

Indelible and Printing Inks

Copying inks are ordinary inks made with less water and a larger amount of pigment and a substance (gum arabic, glycerine, etc.) which will retard the oxidizing effect of the air An other special ink is the marking ink used for linen, etc This is usually made from silver nitrate, suitably treated It stands all conditions well, but gradually turns pale brown

Printing inks are quite gummy, adhesive substances In the "fountains" of the printing presses this ink looks like heavy black or coloured pitch, and the oils contained in it give it a distinctive though pleasant smell

A good printing ink must fulfil many requirements It must distribute freely over the roller, spread sharp and clear over the type, and come off easily from the type to the paper The best printing inks are mixtures of carbon black or gas-black and linseed oil, some form of resin



WHERE INK COMES FROM

(1) Chinese ink-makers straining their mixture of glue and lamp black. The iron-gall ink used nowadays is made from tannin obtained from Aleppo galls shown whole (2) and in section (3), or else the dried, Indian fruit, rather like prunes, called myrobalans (4). The galls are produced on oak trees by the gall fly (6). The drawing ink—sepia—comes from the ink sacs of cuttle fish (5), whilst marking inks are sometimes made from an Indian nut—semecarpus (7).

oil is generally used as well. Common soap is also an ingredient. Gas-black is made by burning gas flames in a scanty supply of air. The flames are thrown against metal slabs or into revolving cylinders, and the soot that accumulates is scraped off and ground.

Inks were used by the Egyptians and the Chinese more than 4,000 years ago. While the exact character of these inks is not known, they were probably simple mixtures of powdered charcoal and glue. The Romans used sepia as a writing fluid. Iron gall inks, however, seem to have been first compounded about the 11th century A.D. From that time forward these inks gradually replaced other inks. In those early days they were usually mixed by the writers themselves, and recipes for their preparation were circulated between friends.

Innocent. POPES. Of the 13 Popes who have borne this name, INNOCENT I was in office from 402 to 417, and is chiefly remembered because of Alaric's sack of Rome in 410.

He was an able and most energetic pontiff, and lost no opportunity of asserting the papal power. INNOCENT II (Pope 1130-43) supported the great scholar Abelard against his opponents.

INNOCENT III (Pope 1198-1216) was in many respects the ablest and most powerful Pope of the Middle Ages. His lofty and severe character inspired universal respect. He greatly strengthened the temporal power of the papacy for, in addition to the Papal States, which he ruled in Italy, he had as vassal states under him Sicily and Naples, Sweden, Denmark, Portugal, Aragon and Poland. It was to him that King John surrendered England, receiving it back from the Pope's legate as a fief. INNOCENT III also put in practice the papal claim to set up and pull down emperors of the Holy Roman Empire, in the case of Philip of Swabia and Otto IV. While he was Pope there occurred the Fourth Crusade and the Latin conquest of Constantinople (now called Istanbul).

INNOCENT VII (1404-06) was one of the Popes during the Great Schism of the Church. Under INNOCENT VIII (1484-92) corruption reigned at Rome. INNOCENT X (1644-55), INNOCENT XI (1676-89), and INNOCENT XII (1691-1700) were all reforming Popes, who combated heresy and sought to improve the Roman administration. The others require no separate mention.

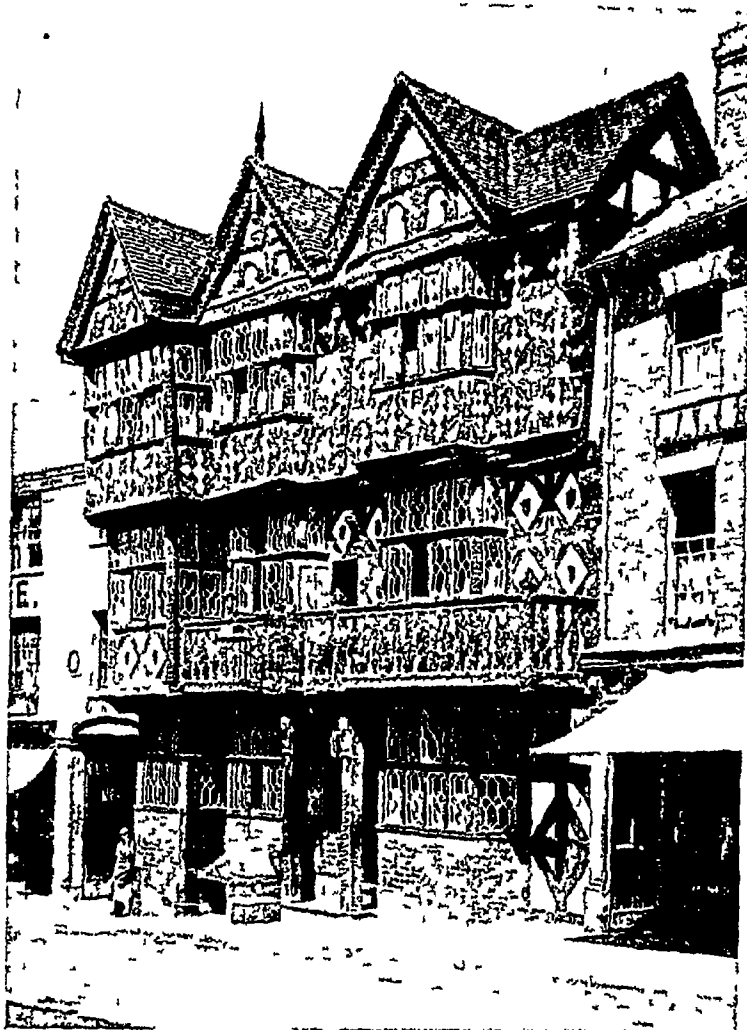
Inns and Inn Signs. Houses where for payment travellers could obtain lodging and refreshment and stabling

for their horses have existed from time immemorial. The earliest inns were the caravanserais of the East where caravans rested for the night. It was in the stable of one of these that Jesus Christ was born.

The earliest English inns date from Norman times. Medieval inns were usually built in the form of a hollow square entered by an archway, having great gates which could be closed at night. Round the walls of the square ran a gallery on to which the bedrooms opened. Very few of these galleried inns still remain, but there are galleries at The George at Huntingdon, The Bull, Dartford, The George, Winchcombe, and The George, Southwark. The old Tabard Inn from which the Pilgrims in Chaucer's "Canterbury Tales" set out was pulled down only at the end of the last century.

Among the most famous English inns still standing are The Feathers at Ludlow, Shropshire, a beautiful half-timbered building,

INNS & INN-SIGNS



painted The origin of the names of many inns is obvious, such as The Bull, The Bell, The Crown, and The King's Head. A very common name is The Marquess of Granby, numbers of inns having been so called after the great soldier of that name, when he returned home in 1763 at the end of a victorious campaign in the Seven Years War. The Duke of Wellington and Lord Nelson have also been commemorated many times in this way. The Chequers, another common sign, is taken from the old game of chequers. A large number of inns bear as a sign the arms of the landowner on whose estate they stand. Thus The Luttrell Arms is named after the family who have for many generations owned Dunster Castle.

The origin of the names of some inn signs is, however, obscure. The Goat and Compasses is held to be a corruption of "God Encompasseth Us," while The Goat and Boots originally had the sign of Mercury with golden boots. The Saracen's Head sign dates from the Crusades, and of many inns bearing this name the most notable in

The Old Hall at Sandbach, Cheshire, The Luttrell Arms at Dunster, Somerset, and The King's Head at Aylesbury, Buckinghamshire. There are numerous others only slightly less famous, Chester being particularly rich in them, many of the smaller ones are now only publichouses.

From Elizabethan times until the 18th century, inns were the resort of writers and poets. The Mermaid in Bread Street, London, was frequented by Shakespeare and Ben Jonson, and Dr Johnson and his friends frequented The Mitre and The Cheshire Cheese in Fleet Street. When railways drove stage coaches off the road the great inns lost much of their custom and many of them became publichouses. The coming of the motor-car, however, has to some extent restored their prosperity.

The innkeeper, like other tradesmen, hung out his sign, generally a rectangular board on which a representation of the name of the inn was



TWO FAMOUS ENGLISH INNS

All over England there are celebrated inns which are amongst the most interesting survivals of a past age. The top photograph shows The Feathers at Ludlow, a fine timbered building dating from 1603. The lower photograph shows The Fighting Cocks at St. Albans.

Photos: E. Bastard, W. H. F. Taylor

INNS

literature was perhaps the old Saracen's Head in Snow Hill, London, where Nicholas Nickleby first met the infamous Mr Squeers

The oldest licensed house in England is the famous "George" at Norton St Philip, in Somersetshire

Innsbruck. Standing on the river Inn, its name meaning "Inn Bridge," this Austrian town is the capital of the province of Tirol and a popular resort of tourists. It is pleasantly situated in a valley at the foot of the Alps, and at the meeting point of the little river Sill with the Inn. It lies about 1,900 feet above sea-level, and is surrounded by mountains averaging



ART ON THE INN-SIGN

The signs outside our wayside inns have long represented a high artistic standard. The Spotted Cow, designed by Ralph Ellis is a striking example of bold, pastoral simplicity. The Cat and the Fiddle at Hinton Admiral, Hants, has a sign inspired by the familiar nursery rhyme

Photos H J Smith courtesy Henty & Constable Ltd

from 7,000 to 9,000 feet in height. The climate is pleasantly mild during autumn and winter.

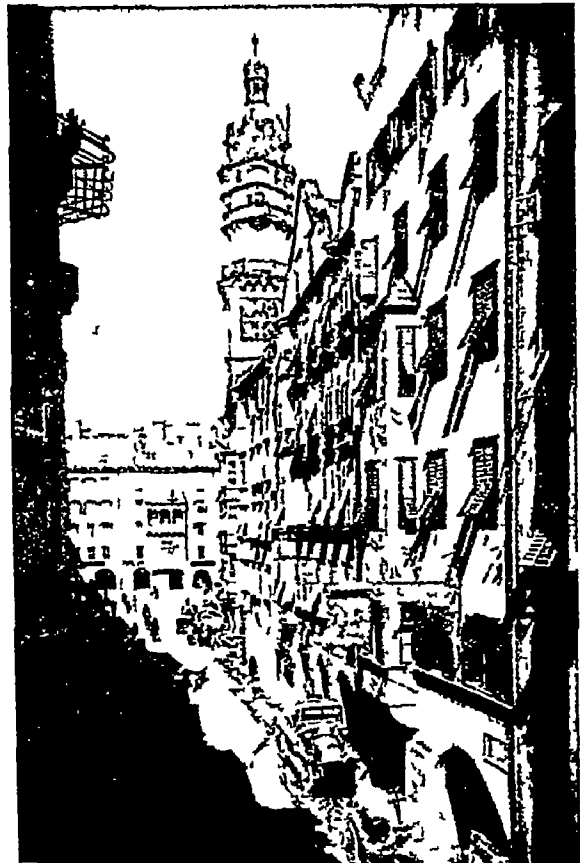
The seat of a university, founded in the 17th century, it has a number of fine public buildings, including the Franciscan church built about 1500 to contain the magnificent cenotaph to Emperor Maximilian I, this consists of a marble sarcophagus, or tomb, crowned by a kneeling figure of the emperor in bronze, while on either

INQUISITION

side are twenty-eight bronze statues of royal personages, by Peter Vischer and others. The Ferdinandeum is a museum with a good Tirolean art, literature and natural history collection. At the foot of Friedrichstrasse is the unique *Goldenes Dachl* (Golden Roof)

The manufacture of glass and glass painting are carried on, and also of cloth. Population, about 56,000

Inquisition. To check the waves of heresy that swept over Europe in the 13th century, the Church of Rome established a special tribunal called the Inquisition to try persons accused of revolting against religious



INNSBRUCK—TIROL'S ANCIENT CAPITAL

Looking down the picturesque Herzog Friedrichstrasse in Innsbruck, capital of the Austrian Tirol, we see the famous Golden Roof facing us at the foot, with the snow-capped Alpine peaks forming a majestic natural background.

Austrian State Travel Bureau

INQUISITION



AN INQUISITOR REPORTS TO THE POPE

In their excess of zeal, Christians of every sect are at times prone to forget their first principle "to love thy neighbour as thyself." The most notorious example of such misdirected zeal is the Spanish Inquisition, which was responsible for the deaths of hundreds of condemned heretics in the 15th century. In this painting by Jean Paul Laurens a pope of the time is seen considering a report of the success of the Inquisition presented by an inquisitor who may be the infamous Torquemada himself.

authority. In 1215 Pope Innocent III sent special delegates, including Dominic, to Languedoc and other parts of southern France to inquire into the existence of heresy, and in 1216 Dominic founded his order to repress it. The Inquisition proper was founded by Innocent IV in 1248 and Dominicans were entrusted with its chief direction.

Arriving in a district, the judges, aided by the local bishop and the State authorities, would announce 30 days' grace for all heretics to come in and confess their crime. When that period was up, the trial of the accused and unrepentant ones began. The names of witnesses were kept secret, but the defendant was permitted to submit a list of enemies, and none of these might appear against him. Following the frequent practice of the period in criminal trials, torture was often used to force confessions of guilt from the obstinate.

At a grand ceremonial, called *sermo generalis* or *auto-da-fe*, the names of the guilty were announced and punishments inflicted, ranging from fines and excommunication to imprisonment for life or burning at the stake for incorrigible heretics. Since canon law forbade the clergy to participate in bloodshed, the severer penalties were carried out by the State.

The Inquisition reached its height in Spain during the days of King Ferdinand and Queen Isabella, when Fray Tomás de Torquemada (1420-98) was made Inquisitor-General for the kingdom. Here the Crown exercised almost complete control over the Inquisition and carried it to extremes, often coming in conflict with the authorities at Rome.

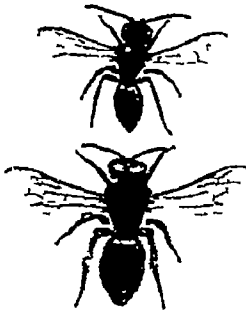
The Inquisition was sometimes used as a cloak for political and private revenge, and at times the sincerest inquisitors were misled by fanatical zeal and practised great cruelties. But on the whole, the institution was a logical product of its time. In those days the Church and State were united in the closest bonds, and heresy was considered a crime against both, to be compared only with high treason and anarchy. To the people of the period it seemed as reasonable to punish a man who "plotted against the life of the Church" as it would in our day to punish a man who plotted against the State.

The Inquisition was chiefly active in southern Europe, and continued in a modified form in Spain until 1820. The Congregation of the Holy Office, established by Pope Paul III in 1542 to review the judgements of the Inquisition courts, still exists. It examines charges of heresy, but imposes only spiritual punishments.

OUR TINY SIX-LEGGED RIVALS

Man wages a never-ceasing battle with the insects, and but for his vigilance and their own wars they might become the masters of the world, so wonderfully are they designed and organized

Insects. When you begin to learn about those amazing little creatures, the first thing to startle you is the fact that they are so numerous. If you could count all the people in the world, all the four-footed animals, all the birds, and all the fish in the rivers and oceans, the total would be small and insignificant compared with the number of insects.



Solitary Bees
(twice life-size)

If you could put all the insects on one side of a huge scale, and all the land animals, including mankind, on the other, the insects, small as each of them is, would weigh down the scale.

Whenever men have tried, for any reason, to calculate insects by numbers, they have reached sums so staggering that the human mind fails to grasp them. For instance, on the island of Cyprus in the Mediterranean, during the fight against the locust plague of 1881, no less than 1,300 tons of locust eggs were destroyed in one year. Yet the next year it was estimated that the locusts which survived laid, on that island alone, 4,000 tons of eggs—making the enormous total of many billions of individual eggs. And yet these figures represent only one particular species in one tiny corner of the earth. And there are in the world at least one million different species of insects.

In all places where life is, these six-legged creatures thrive and multiply—flying, creeping, burrowing. Most people pay little attention to them, except when they are bitten or otherwise bothered by some of the bolder members. Yet insect habits and history are stranger than the weirdest tales of fairy land, and these tiny creatures influence, directly or indirectly, our everyday life to an unbelievable extent.

Imagine yourself a pygmy one inch high pushing out into the insect world to learn their customs at close range. You would need to have, of course, some magic pass word to ensure your safety, or you would be killed within an hour. You would learn as your first lesson

that in insect land "might is right." Death lurks at every corner. Each hole in the ground or hollow beneath a stone may hide some nightmare monster with yawning jaws waiting for its prey. A dead leaf may conceal a hungry enemy who will pounce upon you as you pass. Or some flying creature may swoop down out of the air to deliver a fatal blow.

Perhaps some wise old ant hurrying by will tell you the two guiding principles of insect life. "To eat without being eaten is the first law of insect land. The second is to lay eggs and provide for the young. There are no other laws."

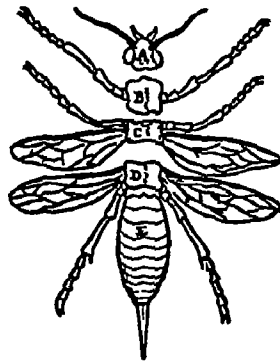
Insects do not kill in anger or hatred, but as a matter of business. Many more million individuals are born every minute than there is room for. Each must struggle hard for existence. Brief as the natural lives of most insects are, not one in a million dies of old age. They fall in war or at their work, or by disease, or by the rigours of climate.

War and work! That's the business of an insect's life. Born with a tremendous hunger, he must start at once to labour and fight to satisfy it. And when he is grown he must turn to and work for the next generation as fast and as hard as he can. Were it not for this constant struggle, insects would soon multiply so rapidly that they would fill the whole earth.

If you can move your two legs fast enough to keep up with the six legs of the ant, you may learn as you travel together about the strange customs and history of its fellows.

"Always remember," the ant will say, "that in our land everything can be traced back to those two laws. All the shapes and colours of insects that seem to you so horrible, or beautiful, are not accidents. They all mean something in our struggle to live; they are our chief defence against our enemies."

"Since there are so many of us, we have only been able to keep going by learning to eat almost anything in the world. Anything that's alive, or has ever been alive, is food for one kind of insect or another. There are even some that live on the gum behind wall-paper, others on old shoes, and the paper in books—they've learned to do that since you men started making such things. Others, such as fleas and



PARTS OF AN INSECT

The parts of an insect are the head (A), the first joint of the thorax (B), bearing the front legs, the second joint (C), bearing middle legs and front wings, the third joint (D) bearing hind-legs and second pair of wings, and the abdomen (E) bearing the egg-laying apparatus and the sting.

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many other parasites, live at the expense of living men and animals. Still others clean up dead vegetable and animal matter.

"But by far the greater number of us feed upon living plants or upon one another. The caterpillar eats the leaf, the wasp eats the caterpillar,

huge front legs with great talons for seizing and holding their prey, like the praying mantis."

Here the old ant stops and holds up its own front feet. "I'm a runner and a climber too, you see. I'm made for work. But my queen has wings and can fly like most other insects."

"All insect tribes that are alive today," it goes on, "have survived because they have some special tricks for avoiding destruction. And these tricks all follow one or more of four systems—numbers, concealment, armour and weapons, and what we may call 'frightfulness,' which is another name for bluff. Now, listen to me awhile, and I'll tell you some thing about each of these systems."

"The numbers system is simple. It consists of laying eggs and bringing up children faster than all our enemies put together can eat them up. This method is used more or less by all insects, but particularly by such helpless creatures as the green-fly, or aphids. You will know from experience in your own garden how hard it is to kill these off. You can destroy ten millions of them, but if one escapes, there'll be millions more born within a month."

"Some insects are genius at concealment. The leaf-insect imitates the colour and shape of a leaf so skilfully that his own brothers, who are strictly vegetarians, sometimes

INSECT STYLES IN FOOTWEAR

The Mole Cricket is the greatest digger for his size in the world. Look at his front foot and you'll see why. With those powerful claws he cuts and scrapes through the earth, scooping it back with that strong broad "palm." That slit at the top of the foot is the Mole Cricket's car-



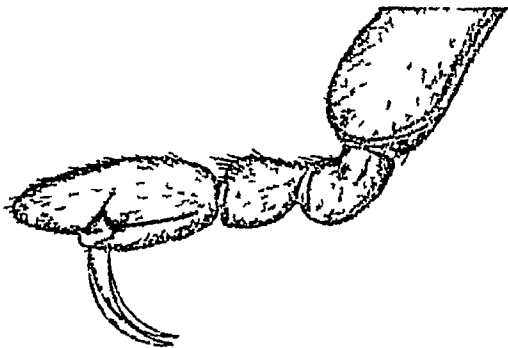
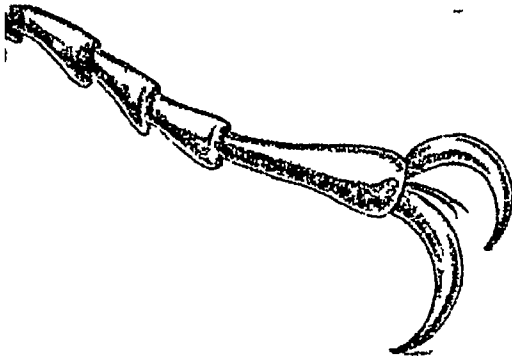
the spider eats the wasp, the bird eats the spider (for though spiders are not members of our family, they often fit into our scheme of existence). Then, when the bird dies in

some forest tragedy, a beetle comes along and buries him, and its grubs eat a part of the body, the rest stays in the ground and makes it rich so that another tree can grow whose leaves another caterpillar will eat. That's the way it goes, always in a circle, one dies so that another can live. After all, it isn't the individual that counts, it's the race."

The ant continues

"The character of an insect's mouth-parts depends on what he eats. Some have strong jaws to tear leaves or bite the bark of trees or gnaw one another. Some have a sucking apparatus to draw in honey or fruit juices. Some have tiny pointed beaks to pierce the skin of plants or of animals whose blood they drink. Indeed, the varied and delicate mechanisms with which insects get their food are much superior to men's mouths."

"The manner of our life also influences our feet and legs. Some of us have sharp claws for climbing or clinging to the bottom of a leaf, while others have sucker-like disks on their feet for hanging upside-down on smooth surfaces. Others still have broad, flat feet for digging, or



Just below the Mole Cricket's foot we see the stag beetle's double claw. The third picture shows the foot of the Ditch Skater that fits over the water of ponds and ditches. The hook is for holding to water plants or to its prey. A fourth picture shows the foot of the Scorpion Fly, which has long spiny legs and grasping claws for clinging tight to its victim.



bite him by mistake. There are plenty of butterflies also that do the same thing, even imitating the stem which attaches the leaf to the twig. This is what you men call 'camouflage'—but it's a very ancient science among insects. Some of us imitate a stick of wood, or the bark

THE CYCLE OF LIFE & DEATH IN THE FOREST



The caterpillar eats the leaf, the wasp eats the caterpillar, the spider eats the wasp, the bird eats the spider. Then when the bird dies in some forest tragedy, a beetle comes along and buries him, and its grubs eat a part of the body, the rest stays in the ground and makes it rich so that another tree can grow whose leaves another caterpillar will eat."



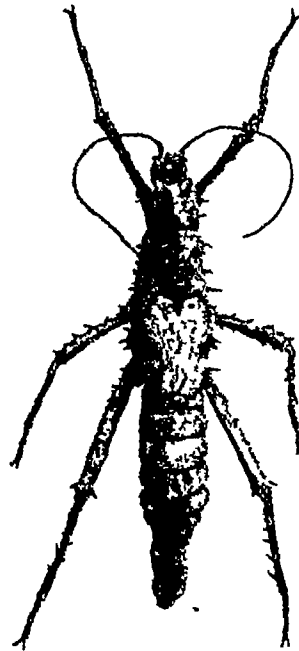
First, a Willow Beauty Moth blending with the bark of a willow tree. Next, two Indian Leaf Butterflies, one with wings open, the other folded.



Third, a Lappet Moth, another leaf imitator. Last, a Walking Leaf Insect, probably the best mimic of all. He even fools his relatives.

of a tree, or a flower blossom. The system works best of all in fooling our two-legged enemies—birds and men—who look for us from a distance.

"But what will interest you most is the armour and weapons we use in protecting ourselves against our enemies. Just feel my back a second," says the ant, stopping short. "Do you see how tough, and smooth, and springy it is?" And the top of my head, too, is covered with the same kind of tough, horny skin. That's made of stuff called *chitin*. Every insect has more or less of this tough, horny substance somewhere about his body. Let me think of a good example, which will make it quite clear to you. Here is an excellent one. Look at the beetles. They are particularly well protected by it. With many of them it amounts to a solid shell of armour that will blunt the sharpest pair of jaws in insect land. The only places on a beetle where I could ever get a hold were at his knees and elbows, or in the soft joints of his stomach. Some beetles can draw their heads and legs so close in that they are quite hidden in neat grooves or folded back on themselves. Then the beetles can sit and laugh at any small

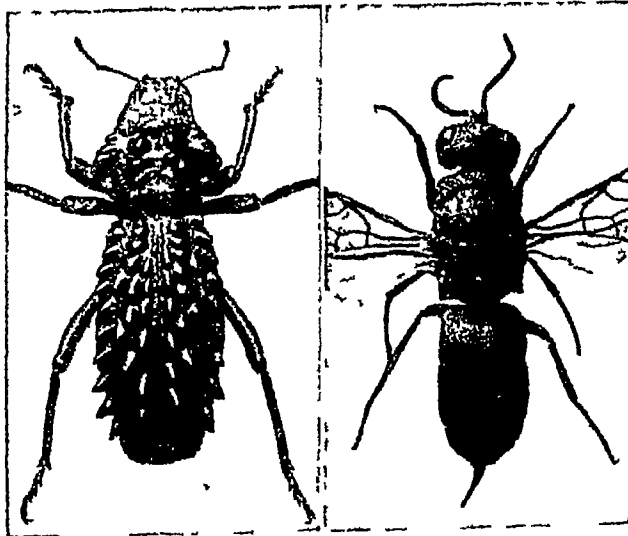


This little creature known as "Gray's Spiny Stick-Insect," looks so much like the thorny bushes on which it feeds that its enemies have trouble in finding it. It's nearly a foot long.

bird that tries to peck through their thick shells. Besides protecting us outside, plates of chitin inside take the place of a bone skeleton, such as you have, and help us to keep our shape, besides acting as supports for the powerful muscles of our legs and wings.

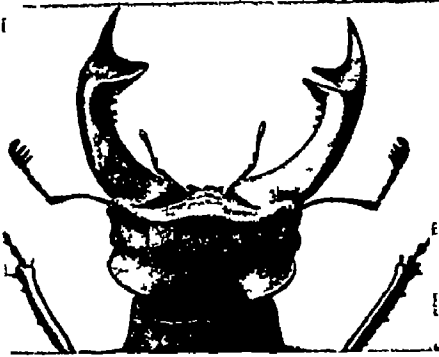
"As for weapons, our jaws, of course, are very effective against enemies who are near our own size. For larger foes, insects have a wide assortment of sharp beaks and poison stings, with which they can inflict painful wounds on the biggest of creatures. The wasps and the bees are the best all-round single-handed fighters. But when it comes to organized warfare, with army formations, massed attack or defence, and all the details of strategy and tactics, together with patriotic courage, the reputation of the ant family speaks for itself, although in pitched battles, our traditional enemies, the so-called 'white ants,' or termites, put up a respectable 'show'."

"The real joke, though," the ant continues, "is the way insect frightfulness or bluff works. You know how the common earwig frightens you men when he curls up that terrible-looking tail of his with its snapping pincers? That's



CAMOUFLAGE AMONG THE INSECTS

Here are seven examples of how insects protect themselves. Of the two directly above (considerably enlarged), that on the left is a Weevil whose "thorns" make him look like a bit of wood, the Ruby Wasp (right) is protected by an extremely hard shell.



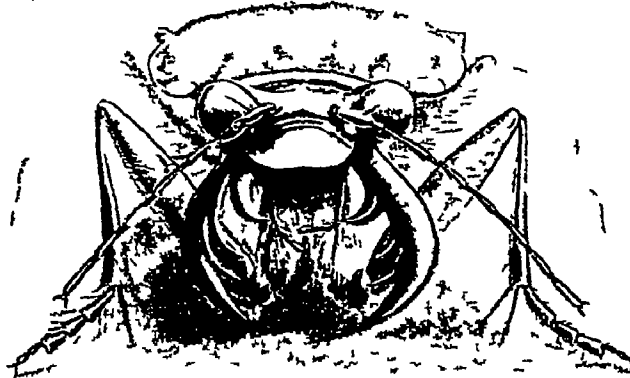
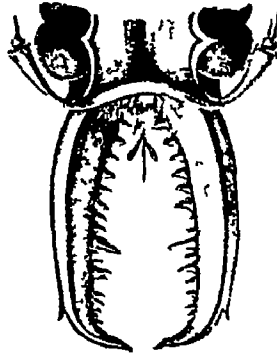
bluff, pure and simple. He couldn't possibly hurt anything with that, yet many an earwig owes his life to the terror he inspires.

"The stag beetle and the African rhinoceros-beetle look so fierce with their horns that they scare insects and even birds away. But if you should put your finger between the stag-beetle's big pincers he wouldn't know what to do. He certainly can't

pinch hard enough to do any harm. There are dozens of examples of such frightfulness. Some harmless insects even imitate the shape and colour of the stinging kind and so escape. Certain flies, for instance, mimic bees, and beetles imitate fierce wasps or flies. But the record for bluff is held by some of the South American lantern flies of the order *Neuroptera*. These are liable to be eaten by certain monkeys or other small animals, among whose own enemies are crocodiles. So the lantern flies have developed the fore part of their bodies to look like a crocodile! When their enemies see this, they get such a shock they hesitate, and thus give the fly time to get away! (See Protective Coloration.)

"Did you ever hear of the bombardier-beetle? He's the real inventor of the poison-gas artillery. When a larger beetle or a bird pursues him he fires a little cannon he carries on his tail. It goes off with a pop and forms a little cloud of blinding gas which covers his escape.

"But if we have a lot of bluffers, we have also some really dangerous characters in insect land which attack even four footed animals and



INSECT MOUTHS FOR DIFFERENT PURPOSES

The busy little people of the insect world have their jaws adapted as tools for different purposes. The first picture on the left at the top shows the mandibles of the Stag Beetle. Next are the 'scissors' with which the Leaf Cutter Bee does such neat work. On the right are the powerful pincers with which the Wood Ant fights and works. The central picture shows the saws of the Sawyer Beetle, while below we see the picturesque countenance of the Green Tiger Beetle. All are considerably magnified.

kill them single-handed. There is a giant water-bug that can kill small frogs and fish, seizing them in his powerful front legs and plunging in his deadly beak. Even among our English beetles we have the fierce *Dytiscus* that will kill the small minnows and gold-fish if it gets into your aquarium. Now I must get back to my work." And with these words the old ant hurries away.

If the ant had had time he might have explained that wonderful feature of insect life we call *metamorphosis*. With very few exceptions insects grow from eggs. Most species after hatching from the egg do not resemble their parents at all. They may be smooth, worm-like creatures, such as the maggot of the bee or the fly, or they may be hairy like some caterpillars, or big fierce looking grubs like the young of the

tiger-beetle and the "ground" beetles (*Carabidae*).

At this period of its life, the insect is called a *larva*, and its only duty is to eat and grow. The period may last only a few days, as is the case with bees and flies, or it may extend over years, as is the case with the cicada, or "17-year locust." This period may be spent burrowing in the ground, hiding in holes in the trunks of trees, swimming in the water, or crawling about in the open air—each according to the habit of its own kind.

In due time, however, the insect enters the *pupa* stage, or *chrysalis* stage (as it is called in the case of butterflies and moths), which is a period of change, but not of growth. For this

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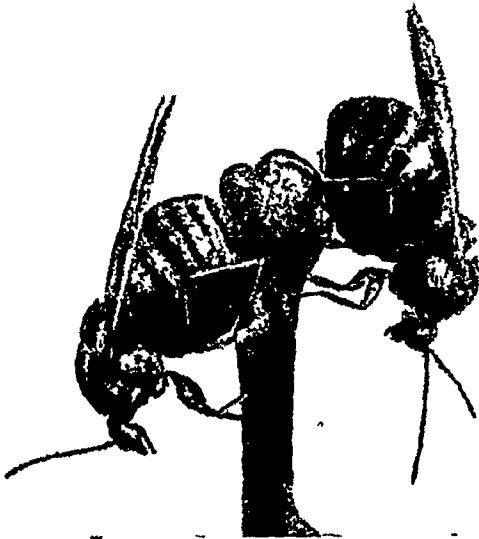
purpose many larvae, such as caterpillars, form a sort of silken cradle called a *cocoon*. During this period the whole shape and structure of the pupa changes, and when it awakes and bursts out of its old skin, it has become for the first time a fully-developed insect like its parents. The ugly caterpillar, for instance, has turned into a handsome butterfly or a moth.

But there are many strange variations and exceptions to this law of metamorphosis. Some insects, like the oil-beetles, pass through two or more larval forms before they become pupae, and the may-flies undergo an additional change after they leave the pupa stage. There are,

on the other hand, many groups of insects, such as the grasshoppers, locusts, crickets, and all true bugs, in which the young resemble the parents just as soon as they hatch from the eggs, needing only to grow larger and to develop wings if they are of the winged kind. Such young insects are called *nymphs* and not larvae. During the growing period nymphs shed their skins several times. This is necessary because the chitin covering of an insect cannot stretch. The larva, of course, sheds its skin from time to time, too, as it grows up.

There are exceptions also to the egg stage, for the young of some insects are born alive. Such insects are called *viviparous* (Latin *vivus*, "alive," and *pario*, "bring forth") to distinguish them from egg-laying insects, which are called *oviparous* (Latin *ovum*, "egg"). Plant-lice, or aphids, have the curious habit of sometimes laying eggs and sometimes producing living young. Furthermore, there are insects which produce young while still in the larval stage, and others while still in the chrysalis, or pupa, stage. Such insects, of course, have usually not been fertilized at all, and this method of reproduction is known as *parthenogenesis* (from the Greek words *parthenos*, "virgin," and *genesis*, "birth").

The social groups of insects—ants, wasps, bees, and termites—that live together in colonies or communities, rank highest in intelligence. These have learned the lesson of

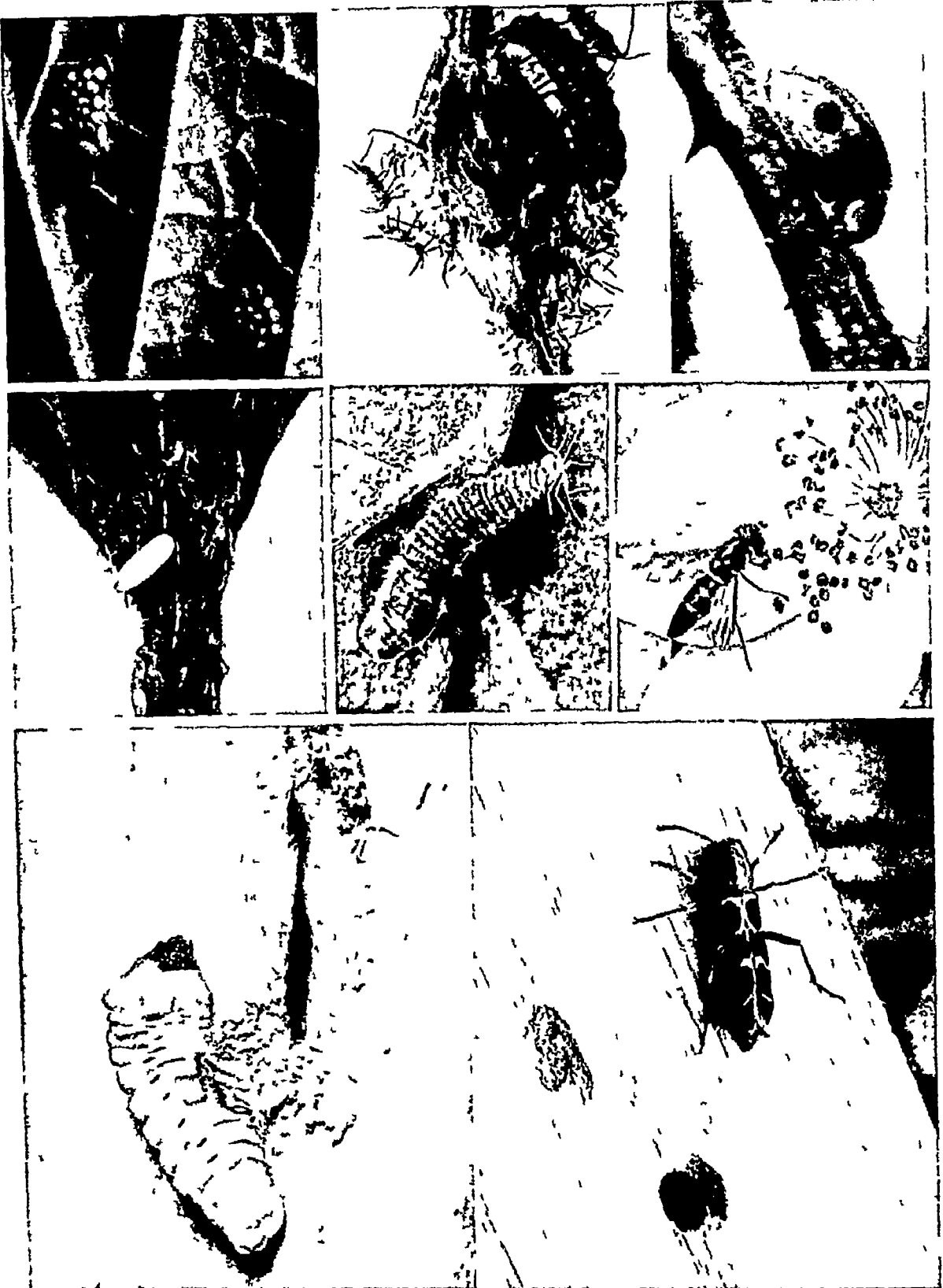


H. Bastin J. J. Ward

GALL WASPS AND GRUBS AND THE GALLS THEY MAKE

The curious deformities known as galls, which we see on all sorts of trees and shrubs in the summer, are the result usually of the working of certain insects, mostly of the order Hymenoptera. In the top picture, considerably magnified, are two of these gall wasps laying their eggs in an oak shoot, where later there will be "marble galls." Below, on the left are three grubs (highly magnified), snugly curled up in the chambers of the "pin-cushion gall," which is shown on the right.

THE LIVES OF MAN'S INSECT FRIENDS AND FOES



While some insects do great damage to Man's crops, flowers, and vegetable products, others, by eating the harmful sorts, are indirectly very beneficial. The top row here shows stages in the life of a ladybird, which does much good by eating aphids (green-fly). On the left are the eggs, middle, a ladybird larva is eating the aphids on a rose bud, right, the adult two-spot ladybird. The centre row shows a similar series from the life of the hover fly, left, an egg, centre, the larva devouring a green fly, right, the adult fly. Below, removed from its burrow in a piece of ash, is the larva of an American wood-borer, which does much harm to timber. On the right is the adult beetle, with the hole from which it emerged.

Photos H. Bastin J. J. Ward A. S. Martin

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co-operation, which reduces the struggle for existence to its easiest terms. With them, the spirit of the hive or nest rules supreme over the willing members. From the earliest times men have found inspiration to devotion and self-sacrifice in the lives of these ingenious insects, as well as much food for thought, in comparing their orderly world with our own chaotic one. (See Ant, Bee)

In general, it is in the nest-building habits of insects that their highest skill is shown, rivalling many of Man's cleverest accomplishments. The carpenter bee, for instance, bores into the solid wood and builds cells for its eggs, lining each one with carefully cut pieces of leaves. The mason wasp constructs a beautiful home

warm weather comes. The colony life of ants and bees, however, continues all the year round.

The chief distinguishing feature of insects is that all of them have six legs, in the adult state, that is, for as you know, many larvae have more than that number if the false "pro legs" are included. Their bodies are always divided up into segments or rings, as explained below. There are a great many creatures which closely resemble insects and are often mistaken for them—for instance, spiders and scorpions, which have eight legs, centipedes, with dozens of legs, and mites and ticks, which have sac-like bodies unbroken by segments.

All the insects belong to the larger group of creatures with jointed legs called *Arthropoda*.

This includes not only centipedes, spiders and scorpions, but marine creatures such as shrimps, crabs and lobsters and their relatives.

The name "bug," which is often applied to insects in general, really belongs to certain special kinds of insects only. Among other peculiarities which distinguish the true bugs—members of the order *Hemiptera*—from other insects is the beak with which members of this order suck plant juices or animal blood.

The body of an insect is divided into three parts—head, fore body, or thorax, and hind-body, or abdomen—each of which, in the faraway ancestors of insects, as in the modern larvae, is further divided into rings or segments. The head bears the delicate feelers or antennae, the mouth parts, and the eyes. The sense of smell is situated chiefly in the antennae. There are two sorts of insect eyes: the compound kind made up of many separate facets or lenses, and



THE TERMITE QUEEN AT HOME

Perhaps no insect is so extraordinary as the queen termite, which lives in a specially-built cell in the heart of the nest. As you see from this life-size picture, she has an enormous body, and this is entirely filled with eggs, which she lays at almost incredible speed. Surrounding her in the "royal cell" are the workers, whose business is to look after her, feed her, remove the eggs as fast as she lays them, and keep away unwanted intruders

of mud, often with a curved porch to keep out the wind. There are spinners of silk and makers of wax, upholsterers, workers in wood-pulp and tree-gums, and hundreds of other special trades and professions represented in the insect world.

Most of these nest-builders store up food for their young. It may be honey or pollen, or the bodies of other insects killed for this purpose. Some wasps even store up living insects, after paralyzing them with their stings, so that their young may have fresh food when they hatch from the egg.

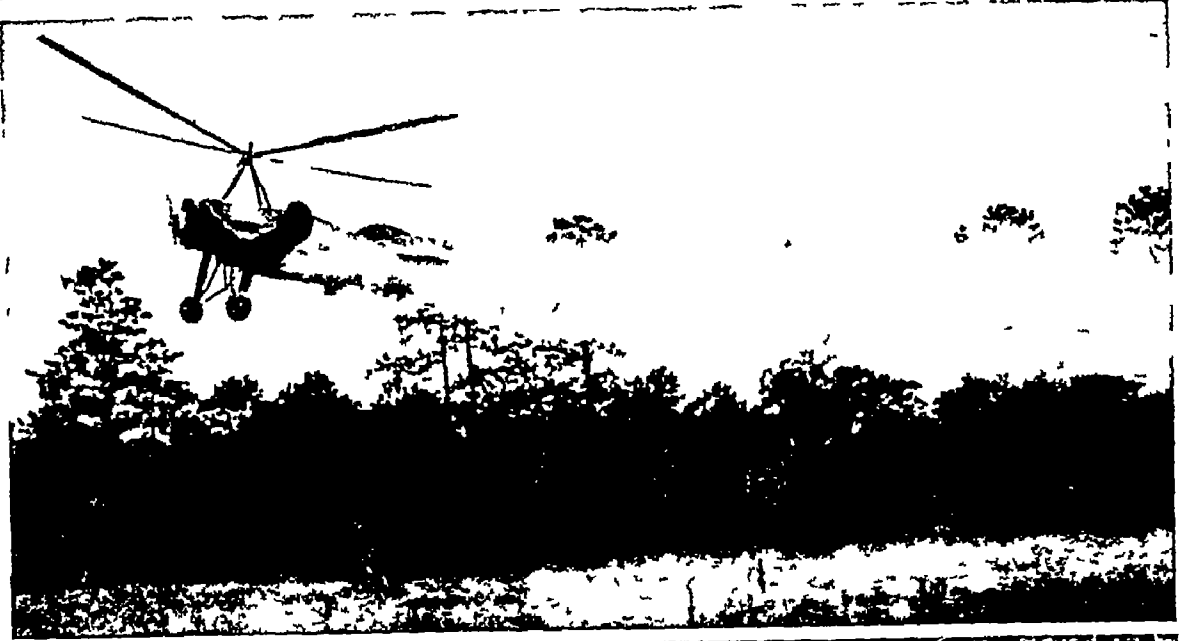
What happens to insects in the winter time? Most of the adult ones die, leaving eggs or half-developed young to await the warmth of spring under ground or in some other protected place. In certain species, like the social wasps, the female sleeps through the cold weather and lays the eggs for the new generation as soon as

the simple eyes, usually known as *ocelli*.

Many insects have both kinds, the *ocelli* being situated between the two prominent compound eyes. In certain mosquitoes and gnats the organs of hearing are found in the antennae, but in most insects they are not on the head at all, but between skin-layers on the body. Crickets and grasshoppers have auditory apparatus on the shins of their forelegs.

The mouths of insects are supplied usually with *mandibles*, or pinching jaws, and *maxillae*, or biting and chewing jaws, as well as certain *palps*, which help to taste the food and to guide it into the mouth, and a *labrum* and *labium*, upper and lower lip respectively. The palps are actually attached to the maxillae and labium, and are called maxillary or labial palps, as the case may be. The size, shape, and arrangement of these mouth parts vary greatly in different species.

MAN'S ENDLESS BATTLE AGAINST INSECT ARMIES



The damage caused by insect pests every year runs into hundreds of thousands of pounds, and enormous sums have to be expended to fight them. The upper photograph shows one way in which this warfare is carried on in America, a slow flying autogiro is being used to scatter a poisonous dust over fields of a crop that is suffering from the attacks of leaf-eating insects. In Britain we usually escape serious insect plagues, but in Scotland during 1937 the caterpillars of the antler moth did terrible damage to pasture-lands, and their dead bodies, filling the streams and ponds, as you see here, endangered the water-supply.

Top Ecystone bottom Star Photos

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In the true bugs, the mandibles are modified into sucking beaks and in general the range of modification for different organs is really extraordinary.

The thorax bears the three pairs of legs, and the wings when these are present. The typical insect has four wings, but in many species, such as the house-fly, they are reduced to two, and in many others they have disappeared altogether. In some insect groups, the males only have wings, in others only the females. Certain species, like the plant-lice, develop wings only under special conditions of diet or weather. Often, as in the beetle tribe, the front wings of insects have become armoured wing-covers, which protect the delicate rear wings when not used in flight.

How the Insect Lays Her Eggs

The abdomen, consisting of a varying number of segments, contains the digestive tract, and in females the egg-laying apparatus, or *ovipositor*. This is often very delicate and complicated, enabling the insect to bore into the ground, or into trees, or through the skins of other insects to lay its eggs. The poison sting, when present, is situated conveniently at the tip of the abdomen. It must be borne in mind that mosquitoes and other blood-sucking insects actually bite with their mouth-parts, and cannot really be said to sting.

Insects have well-developed brains and nervous systems. A simple contracting heart-sac provides for the circulation of blood. They have no lungs and do not breathe through their mouths. Air is drawn in through tiny holes, or *spracles*, in the body-segments, and passes through an intricate system of branching tubes, or *tracheae*, carrying oxygen to all parts of the body.

The muscle system in insects is perhaps as delicate and complicated as in any higher animal. Scientists with microscopes have counted as many as 4,000 muscles in the body of one caterpillar.

Making an Insect Collection

The collection and study of insects, which forms the science known as *entomology*, is fascinating and profitable work for old and young. Flying insects are best captured by using a butterfly-net. They may be killed without injury by dropping them in a glass jar filled with a suitable substance giving off poisonous fumes—such a jar being known as a killing bottle. You can make up such a bottle for yourself with crushed laurel leaves, or have one made up with potassium cyanide by a chemist. This is a *deadly poison* and must be used with care. A killing bottle of this type works very quickly, but leaves the insects very stiff when they are dead. The professional entomologist generally uses a small bottle containing cotton wool soaked in a little acetic ether, and if you can get one of this type it is the best of all. Once they are dead,

the insects should be "set." The method of setting and the position in which the insects are fixed vary according to the type. Butterflies and moths are set with the wings spread wide and flat, either the right way up, or upside down. Bees and flies and similar types are also set like this, the legs as well as the wings being spread out. Beetles, however, except the largest, which are pinned like other insects, are set on cards with gum tragacanth to hold the legs in position. The cards are then pinned into the collecting boxes. The collection and setting of insects is an expert business and you should only use the right apparatus—home-made setting boards, boxes and "any old pins" never produce a good result. When mounted, labels bearing the name of the specimen should be neatly pasted underneath. A small magnifying glass is essential for insect study.

About 300,000 species of insects have been collected, named and described by scientists. But by far the greater part of the insects which inhabit the world are still unknown to science. Hundreds of new species are discovered every year. Estimates of the number of species run from one to several millions.

As a class, insects are found in virtually all parts of the world. But insects flourish best in warm countries. In the tropical forests of Africa insects of every kind swarm in incredible numbers and breed throughout the year.

Bad and Good Work Done by Insects

From Man's point of view, insects may be divided into the harmful and useful classes. Many kinds, like grasshoppers and locusts, plant-lice, scale-insects, cotton-weevils and the caterpillars of nearly all moths and butterflies, do an immense amount of damage to trees, crops, domestic animals, and food stores. Others, such as cockroaches, flies, fleas, mosquitoes, and gnats, annoy men and animals and even spread some of the most dreaded diseases of Mankind, such as malaria, yellow fever, and that terrible scourge, bubonic plague.

But there is another side to the story which is too often overlooked. If it were not for bees and other nectar-seeking insects, which carry the fertilizing pollen from flower to flower, it would be almost impossible to raise many kinds of fruit and other crops. Bees had to be imported into Australia to make the cultivation of red clover possible. If it were not for the beetles and wasps and others, which destroy every year vast numbers of the harmful insects, our fields and gardens would be overrun with pests of all kinds. Many insects which burrow in the ground do a great work as cultivators. Countless scavenger insects help the bacteria in getting rid of refuse for us. Besides, certain insects manufacture substances of great value, such as silk, honey, wax, dyes, and shellac.

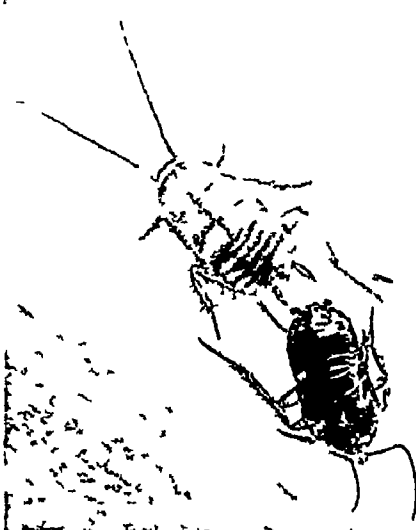
INSECTS

Only two kinds can be domesticated with profit—the silkworm and the honey bee

Insects appeared on earth long before mammals, some scientists claiming to have found insect remains in Silurian rocks (See Geology) It is certain that the forests of the Coal Age contained many insects, some measuring two feet across the wings From that time on,

thanks to their rapid propagation and powers of concealment and defence, they have held their own against later forms, and today they are Man's most formidable rival for mastery of the earth and its riches

The classification of insects for scientific purposes varies as new species are discovered Below is a common modern classification



How the Insect World is Classified

CLASS *Insecta*

SUB CLASS *Apterygota* This comprises three small orders (Nos 1 to 3) of primitive wingless insects which have no metamorphosis *Thysanura*, *Protura*, and *Collembola*

SUB-CLASS *Pterygota* This includes all the other insects.

DIVISION I *Eropterygota* Popularly speaking, these are those insects whose immature forms are "nymphs," more or less resembling their parents and without a complete metamorphosis.

ORDER

- 4 *Orthoptera* (Cockroaches, grasshoppers, stick-insects, etc)
- 5 *Dermaptera* (Earwigs)
- 6 *Plecoptera* (Stone flies)
- 7 *Ephemeroptera* (May flies)
- 8 *Odonata* (Dragon flies)
- 9 *Isoptera* (Termites or white-ants)
- 10 *Embioptera* (Small tropical insects)
- 11 *Psocoptera* (Book lice)
- 12 *Anoplura* (Biting and sucking lice)
- 13 *Thysanoptera* (Thrips, small insects, often pests in gardens)
- 14 *Hemiptera* (Plant-bugs, including the plant-lice or aphids)

DIVISION II *Endopterygota* Insects whose metamorphosis is complete, including larval and pupal stages All the higher orders belong to this division

ORDER

- 15 *Neuroptera* (Ant-lions, lace-wing flies, alder flies etc)
- 16 *Coleoptera* (Beetles)
- 17 *Strepsiptera* (Tiny insects parasitic on bees)
- 18 *Mecoptera* (Scorpion flies and similar forms)
- 19 *Trichoptera* (Caddis flies)
- 20 *Lepidoptera* (Butterflies and moths)
- 21 *Diptera* (True, two winged flies)
- 22 *Siphonaptera* (Fleas)
- 23 *Hymenoptera* (Ants, bees, wasps, saw flies, and ichneumon flies)



THE CHIEF ORDERS OF INSECTS

These six photographs show you typical members of the most important orders of insects They are top row left, a magpie moth (*Lepidoptera*), centre, a cockroach which has just shed its skin (*Orthoptera*), right, a potter wasp at its mud nest (*Hymenoptera*) The central picture shows a daddy-long-legs or crane fly (*Diptera*) Below are left, a cardinal beetle (*Coleoptera*) and a leaf-hopper (*Hemiptera*) These pictures show how wide is the range of insect form Sizes life-size, $\times \frac{1}{2}$, $\times 5$, less than life-size, life-size, $\times 2\frac{1}{2}$

Photos Ward Crawford Hinkins Bastin

Insurance. In our daily lives we are surrounded by dangers and risks. The father of a family may die suddenly and leave his widow and children penniless. He may be struck by a motor-car and lie for weeks in a hospital. His home or his shop may burn down. No one knows but that he may be the next victim of misfortune, so he is willing to pay a certain yearly sum of money in return for assurance that he or his family will receive a much larger sum in case of misfortune. He does this by joining a company of men who also want the same protection. Each member pays a certain amount into the treasury. When one of the members dies or his house burns down or he has an accident, the insurance company pays him or his family a certain agreed sum.

That, in a nutshell, is the fundamental principle of insurance. It rests upon the obvious fact that a burden which would crush one man can easily be carried if distributed among many men.

The earliest forms of insurance were against the loss of ships and cargoes at sea. Possibly insurance was known in ancient times, but the first records date from the Middle Ages, and the first English law on the subject was not passed until 1601. The earliest known life insurance

policy was issued in 1583. For nearly three centuries thereafter insurance was limited to the three fields of marine insurance (including ships and cargoes), life insurance (also known as "assurance"), and fire insurance.

One of the oldest and most famous insurance companies in the world is Lloyd's of London, described in a separate article.

The great development of insurance in all its branches coincided roughly with the spread of industrial organization in the second half of the 19th century. Special companies now insure against accidents, ill-health, theft and burglary, damage to motor-cars or by motor-cars, damage by storms, aeroplanes, and losses from bad debts or embezzlement by employees. It is even possible to take out insurance which will compensate one in the event of rain or snow on a specified date. In short, it is now possible to insure against almost any kind of inconvenience, loss or suffering.

The commonest form of insurance policy is the "ordinary life" under which a person pays a fixed annual sum for life in return for which a lump sum (say £1,000) is payable on his death to his dependants. The next most popular form is the "endowment" policy. Here the annual payments are for a limited period only (usually 20 years), and the insured himself is then entitled to the whole sum (say, £1,000) or, if he dies at any time during the progress of the policy, his dependants receive the whole £1,000.

An interesting development in recent years is that by which a person who buys his house on mortgage from a building society is able to protect his dependants against dispossession if he dies without paying all the mortgage repayments. This he does by means of a special kind of policy under which all outstanding payments on his mortgage are automatically wiped off at his death.

"Third-party" insurance covers accidents to a person or persons outside those specifically mentioned in the insurance policy. Insurance covering third-party risks must be held by every person using a motor-car.

How Premiums are Fixed

No matter what the kind of insurance, the payment made for the protection is called the "premium." This is reckoned by the law of averages, which is well illustrated in the case of fire insurance. For many years the insurance experts have kept records of losses by fire, not only as to the number of buildings burned, but as to the relative loss in various types of construction and kinds of business. Obviously, an ironmonger's building with steel beams, brick walls, and a tile roof is a much better risk than a lumber mill built of wood. A wooden dwelling with a shingle roof carries a higher risk than the



INSURANCE AND EDUCATION

By insurance a father can make provision for the education of his children. A policy is taken out when the child is a baby, under which a sum is paid at the age of 12 or 15 years, when school fees are likely to be at their highest. In this picture a father is explaining to his family the wise provision he has made for the youngsters' education.

Courtesy Eagle Star & British Dominions Insurance Co

same house with a tile or slow-burning composition roof, brick houses carry lower rates

In Great Britain, practically all persons of from 14 to 65 who are employed, and whose income is less than £250 per annum, must be insured under the National Health Insurance Act. Persons with incomes between £250 and £400 may insure voluntarily under the same scheme. The cost is borne jointly by the State, the employer, and the employee. This also applies to Unemployment Insurance, contributions to which are compulsory for most workers from 14 onwards. The "Dole" is the colloquial name given to the weekly insurance benefit payable to unemployed workpeople, who have paid their contributions over a prescribed period while in employment.

Intelligence Tests.

Early in the present century, two French psychologists, Théophile Simon and Alfred Binet, were commissioned to find out why certain children in the schools of Paris lagged behind their classmates in school work. These men discovered that by obtaining the average performance of children of various ages on different tasks, they could measure mental ability. Such tasks as pointing to the nose, eyes, and mouth, repeating two numbers after they had been pronounced by the examiner, telling what objects are seen in certain pictures, giving the family name, and repeating a sentence of six syllables, were found

to lie within the mental ability of average three-year-old children. If a three-year-old child can do them, he is said to have a mental age of three years, since he can do what the average three-year-old can do. But if a five-year-old can only do them and not those for the four-year-old or five-year-old, he is said to have a mental age of three years. Similar but more difficult tasks were used for older children. Tests were selected which would measure native ability rather than home or school training, hence they covered a wide range of tasks that are common to the environment of all children. Recently series of tests have been devised for measuring

the mental ability of children from the age of one and one half years to five and one half years. These tests can be administered successfully only by a trained investigator.

It was the World War that gave the greatest impetus to the development of intelligence tests, and this took place in the United States. Millions of men were being called to military service. It was necessary to discover immediately how each of these men could best serve his country, and the Army Test was developed and ultimately given to 1,727,000 American soldiers. Its purpose was to rate natural mental ability—the ability to learn, think quickly and accurately,

analyse situations, and comprehend and follow instructions. The results were evaluated according to military needs, and men with a certain average of intelligence were selected for different tasks in accordance with their rating.

This test revealed some startling facts. For example, 45,000 of the men made no higher scores than the average ten-year-old boy would be expected to make.

About 10,000 men were found mentally unfit for any military service. The saving to the nation through being spared the expense of training and transporting these men was enormous. More important, it was possible to select the men best qualified to make officers, aviators, gunners, etc., and thus to place individuals to the best advantage. From

this time on, intelligence tests in the U.S.A. were firmly established as a dependable method of determining mental ability.

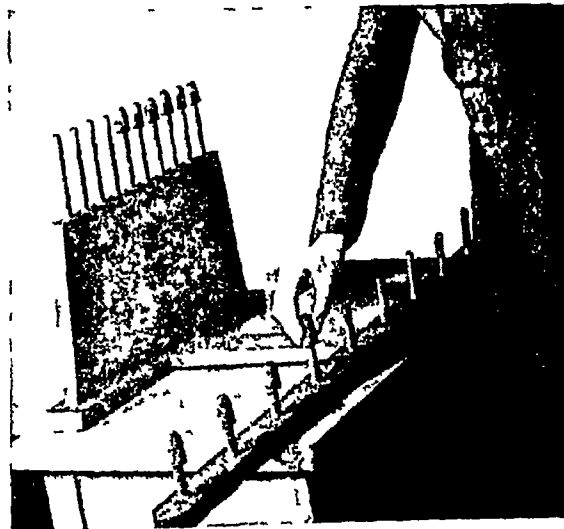
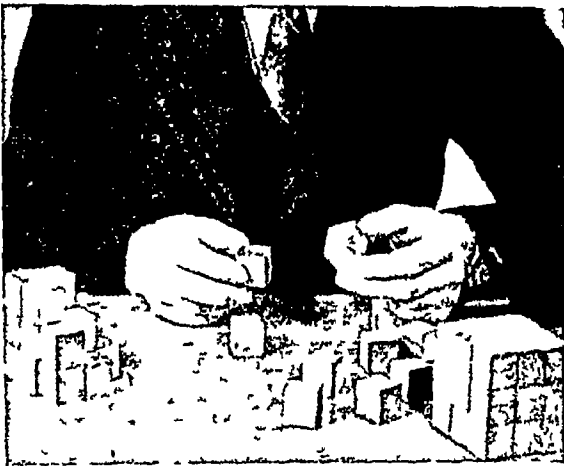
After the War, psychologists developed similar tests for use in schools. Hitherto it had not been practicable to give mental examinations to school children generally because of the difficulty and expense entailed by individual examinations. But group tests have now been devised and are used every year in schools to measure the mental ability of pupils.

Psychologists have found that the mental ability of a child generally develops at a constant rate as the child develops physically, that is,

| | |
|----|---|
| 1. | ○ ○ ○ ○ ○ |
| 2. | ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ |
| 3. | |
| 4. | |
| 5. | ○ ○ ○ Yes No |
| 6. | ○ ○ ○ MILITARY GUN CAMP |
| 7. | 34-79-56-87-68-25-82-47-27-31-64-93-71-41-52-99 |
| 8. | |

A TEST FOR QUICKNESS AND ACCURACY

The instructions for each part of the test, and time in which they must be carried out, are as follows: 1. Make a cross in the first circle and a figure 1 in the last circle—five seconds. 2. Draw a line from circle 2 to circle 5 that will pass below circle 3 and above circle 4—five seconds. 3. Make a figure 2 in the space which is in the triangle but not in the square, and make a figure 3 in the space which is in the square and in the triangle—ten seconds. 4. Make a figure 2 in the space which is in the triangle but not in the circle or square, and make a figure 3 in the space which is in the square and circle but not in the triangle—ten seconds. 5. If a captain is superior to a corporal put a cross in the second circle; if not, draw a line under the word "No"—ten seconds. 6. Make in the first circle the third letter of the first word, in the second circle the first letter of the second word and in the third circle the first letter of the third word—ten seconds. 7. Cross out each number that is more than 60 but less than 70—15 seconds. 8. Draw a line through every even number that is not in a square and also through every odd number that is in a square with a letter—25 seconds.



TESTING THE WORKER'S ABILITY

A development of industrial psychology that forms a parallel with intelligence testing, with which, indeed, it may be used in close conjunction, is the testing of manual dexterity. By this means it can be discovered for which branch of industry a worker is fitted, or whether, perhaps, he is suited by nature to none of them. Above are examples of such tests: top, arranging and matching coloured cubes of wood, centre, a weaver's test of threading string through eyes facing in different directions, bottom, copying a simple design by changing thimbles on wooden "fingers" to similar positions.

Courtesy of National Institute of Industrial Psychology

there is a fairly constant ratio between mental age and age in actual years. This ratio is called the I Q or *intelligence quotient*. It is obtained by dividing the mental age (determined by means of various intelligence tests) by the age in years of the person tested, and multiplying the results by 100. For example, if a child has an actual age of 8 years and a mental age of 10, his I Q will be 125 ($10 \div 8 = 1.25 \times 100 = 125$). At the chronological age of 10 this same child would probably have a mental age of a 12½-year-old, for his I Q of 125 would remain constant. The I Q of an individual, therefore, implies that if Mary is exceptionally brilliant in her early years at school, she very probably will be equally outstanding in the later years. On the other hand, little John, who has great difficulty in solving the simplest problems of the lower grades and is always at the foot of his class, will probably lag behind his classmates as long as he remains in school. Feeble-minded persons committed to institutions seldom have intelligence quotients over 70. An I Q of 140 or more usually indicates high mental ability. There are also tests for measuring specific aptitudes and these are coming into use in industrial psychology.

Value of Intelligence Tests in Schools

Tests for measuring school attainment have been developed during recent years. These are known as *achievement tests* and are used for rating the progress of pupils in school subjects. By comparing a pupil's attainments with the norm, or average, for his mental age, a teacher can quickly see whether the pupil is doing as well in a particular subject as average children.

There is a growing practice of grouping school children into classes on the basis of mental ability and school attainment rather than on the basis of physical age. Classes for backward and sub-normal children have long been provided, classes for gifted children are now being more and more widely organized, with instruction adapted to the superior mental ability of these children.

Intelligence tests are, however, not an absolute criterion of general intelligence, but of particular ability in one or more subjects.

Internal Combustion Engine.

We cannot say that the motor-car, the aeroplane, the airship, and the submarine could not have existed at all without the internal combustion engine. But it is certain that without it they would not have been developed so rapidly, so efficiently, or so economically. The steam engine requires a heavy boiler, a fire, and a large supply of fuel. The electric motor must get its electricity from a wire connected to a stationary plant or from a storage battery which is not only heavy but quickly exhausted. We may be sure that, with only steam and

INTERNAL COMBUSTION ENGINE

electricity, flying at least would not be a practical affair to day

The I C engine (to use the customary abbreviation for "internal combustion") is compact, light, and capable of very high speed. It is economical, simple in construction, and easy to operate. The uses to which it is put on the farm—where it has largely taken the place of the windmill—and in the shop are almost innumerable, and it is found in almost every house or building that has its own electricity supply. In construction work it performs many of the tasks formerly assigned to the "donkey" steam engine, such as cement mixing, running elevators and derricks, driving compressors for pneumatic drills, etc. In many places where natural gas or other motor fuel is cheap, big engines are used to generate electricity for public use. In all parts of the world—in the burning deserts, on far-away coral islands, in the Arctic regions, in tropical forests—you will find these engines helping to do Man's everyday work.

Fuel for the I C Engine

Although petrol is the most commonly used fuel for such engines, any substance capable of forming an inflammable vapour or gas under ordinary conditions may serve the purpose. Illuminating gas, blast furnace gas, paraffin, alcohol, crude petroleum, acetylene, and scores of other substances can be employed if suitable appliances are used. The principle in each case is, as we shall see, exactly the same, and depends upon the expansive powers of such gases or vapours when mixed with air and ignited.

These engines are called "internal combustion" engines because they depend for their power upon the pressure created by the gases burning within the motor itself, and not upon boilers or other external generators of pressure. Their early development was so gradual and so interwoven with other inventions that no one man is given the credit for being the actual discoverer of this type of power machine.

The first steps in this direction seem to have been taken late in the 17th century, when certain scientists experimented with "explosion" engines operated by gunpowder, without practical results. In 1791 an Englishman named John Barber took out a patent on a turbine run by illuminating gas. In 1794 Robert Street used the explosions of turpentine vapour to drive a piston, and many others followed. But it was not

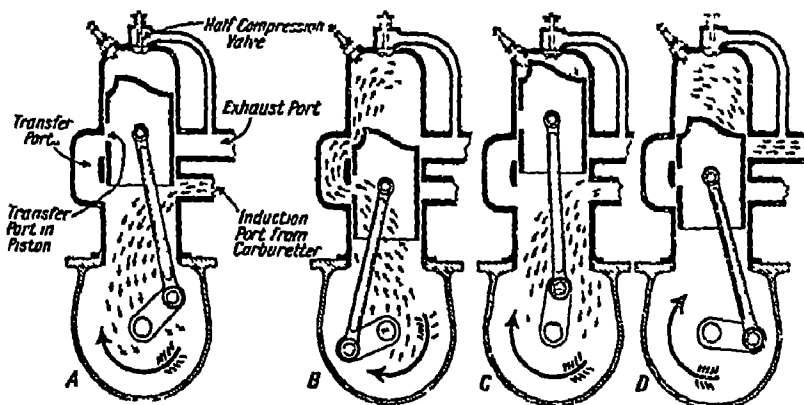
until 1860 that Etienne Lenoir, a Frenchman, invented an engine which came into commercial use. The credit for devising the I C engine as we know it today rests, however, with Dr. Nicholas Otto of Cologne, Germany, who worked out in 1878 the "four-stroke cycle" system found in most modern engines.

In its simplest form the I C engine consists of a cylinder open at one end and a piston sliding back and forth in the cylinder and joined to a crank on the power shaft by a connecting rod. On the shaft is a heavy flywheel, whose momentum helps to keep the shaft turning once it has started. The explosive mixture is taken into the cylinder by way of ports near the bottom of the cylinder, on the opposite side there are similar ports for the exhaust.

In such an engine—the "two stroke" type—which is very popular in outboard boat engines, there is a power stroke for each revolution of the shaft, or up and down movement of the piston. As the piston reaches the bottom of its stroke, it uncovers the ports and the exhaust gases rush out, while at the same time the fresh gas mixture, which has been compressed in the air tight crankcase, rushes in from the other side. The upward stroke of the piston not only compresses the fresh mixture, but sucks a new supply into the crankcase. Then the explosion at the top of the stroke starts a new cycle. The explosion is caused by an electric spark.

By far the greatest use of the Otto, or four-stroke, engine is in motor cars. Instead of having ports near the bottom of each cylinder, however, the mixture enters near the top through passages opened and closed by mechanically operated valves and the exhaust gases pass out through similar passages. For a simple description of the operation of the four stroke engine, see the article on the Motor-car.

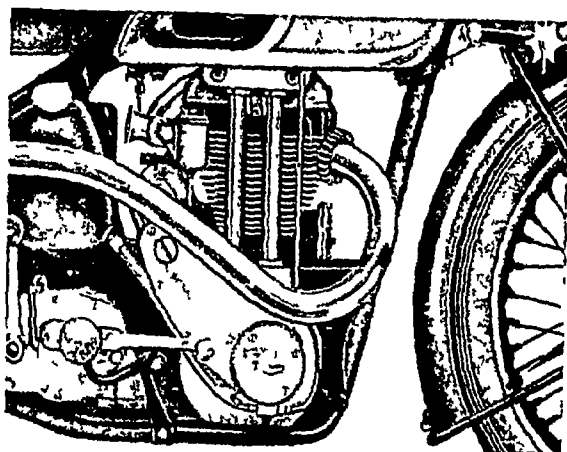
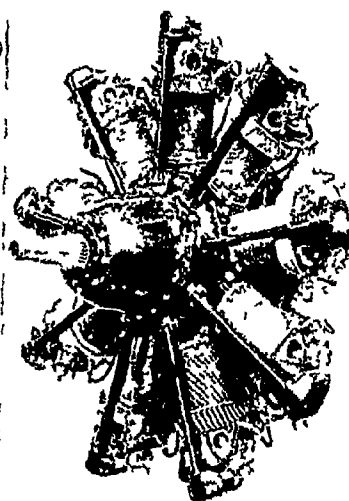
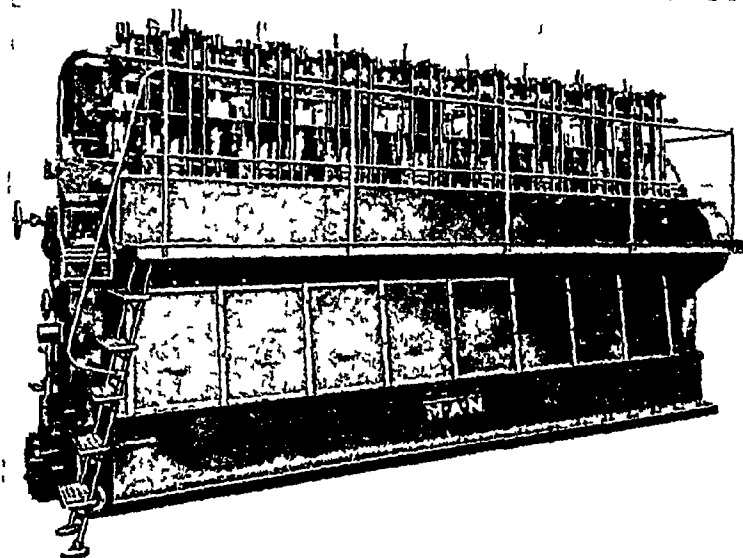
The operation of the valves is controlled in such engines by cams driven from a shaft which turns at one half the speed of the main shaft.



CYCLE OF THE 'TWO STROKE' ENGINE

These diagrams illustrate the working of a 'two-stroke' engine—that is, one in which an explosion takes place in the cylinder on every upward piston stroke. (A) induction and compression of the mixture, (B) transfer to cylinder, (C) explosion, and (D) exhaust. The two-stroke has a distinctive "purring" engine note.

INTERNAL COMBUSTION ENGINE



TYPES OF I C ENGINE

The internal combustion engine is used today in many forms. We have, for instance, marine Diesel engines such as the huge unit of 1,500 B H P (above, left), aero-engines, among which the Bristol Pegasus nine-cylinder radial (above, right) is outstanding, and motor-cycle engines, an example being the single-cylinder 500 c c Triumph (below, left).

Photos courtesy 'The Motor Ship' and The Bristol Aeroplane Co. Ltd.

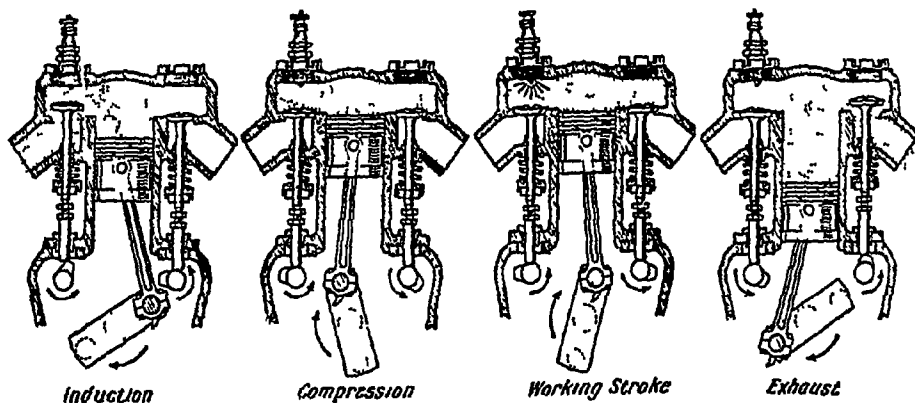
This camshaft also usually controls the mechanism which times the spark to fire the charge. The most common method of securing the spark makes use of a sparking plug, a device with a porcelain core enclosing a central wire, or electrode. The metal shell holding the core is fitted with another wire, which is separated from the central wire about one thirty-second of an inch, this "spark gap" is inside the

cylinder. A wire from the coil or magneto leads to the central wire of the plug, the current thus being forced to jump the gap between the wires in order to return through the metal of the engine to the other side of the ignition source.

Here is what happens when a one cylinder, four-stroke engine is running. The piston is drawn down, opening the inlet valve and sucking the gas into the cylinder. This is the first stroke. As the piston starts upward on the second stroke, the inlet valve is closed, and the gas that has been sucked in is compressed into the top of the cylinder. As the piston reaches the top of its stroke the electric spark is set off, exploding the gas and forcing the piston violently downward on the third stroke. As it comes up on the fourth stroke, the exhaust

valve opens, and the piston forces out the burned gas. The next stroke sucks in a fresh supply of gas and the whole process is repeated over again.

As may be seen, there is only one explosion to every four strokes of the piston and thus to every



THE FOUR-STROKE CYCLE

Here we illustrate the principle of the "four-stroke," which is utilized in the majority of motor vehicles. The obsolete T-headed type of engine is shown in order to indicate clearly both inlet and exhaust valves.

INTERNAL COMBUSTION ENGINE

two revolutions of the crankshaft. The force of this explosion is taken up by the flywheel whose impetus keeps the engine moving until the next explosion. In two cylinder engines the cylinders are timed so that one of them explodes at each revolution, giving a more continuous flow of power. If there are four cylinders, one of them explodes at each half revolution and so on for six, eight, and twelve cylinders, but they do not operate in order, or the engine would be unbalanced. The cranks for the separate cylinders are, of course, arranged on the shaft to conform with the time of the explosions.

The crankshaft, the camshafts, etc., are enclosed in a covering called the crankcase. The bottom of the crankcase is filled with oil, and when the engine is running a pump, worked from the camshaft, forces the oil to the bearings and moving parts.

Action of the Carburetter

So far, we have seen all the essential parts of an engine designed to run on ready-made gas. But when petrol or any other liquid fuel is used, the Otto type of engine has to have an attachment for turning this liquid into a gas or vapour and mixing it with air so that it will explode. This attachment is known as the carburetter, and may be called the "lungs" of the gas engine. Acting under the suction of the piston, air is drawn at tremendous speed through a narrow passageway in the carburetter. This passageway is called the jet and it is kept filled with petrol by a float device. As the air rushes past the valve, it draws out the fuel in a fine spray or vapour, which mixes with the air and is thus carried into the cylinder. When even more pressure is wanted a "super-charger" is used which forces the mixture into the induction system, as the carburetter and pipes joining it to the cylinders are called.

An almost endless variety of types of petrol engines has been developed to meet various requirements, from the steady, heavy stationary type to the light, powerful aeroplane motor.

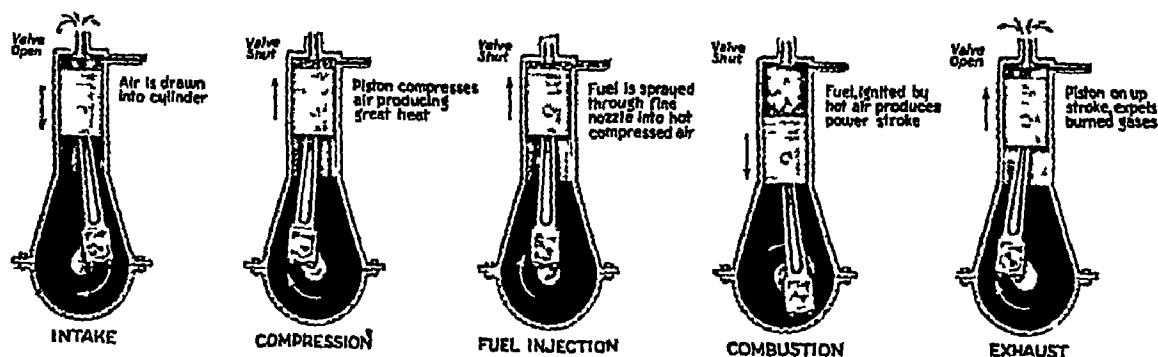
Diesel engines, which became famous during the World War of 1914-1918 because of their use in German submarines, differ in some respects from the usual internal combustion engine. They do away with any carburetter or electrical ignition system, the fuel being spontaneously ignited by piston pressure.

A Diesel engine may be built either as a two-stroke or a four-stroke type, many marine Diesels are what is known as "double-acting" two stroke engines, in which a thrust is given to the piston from both sides, as in steam engines. Such engines develop great power with notable economy. Diesel fuel is cheap, there is no fire risk to speak of, and every year sees a greater proportion of ships built with these engines. Indeed, so great is the saving in operation of this type that Diesels may in time replace steam engines at sea.

The Diesel enables ships to get one horsepower from about a third of a pound of fuel oil, without a boiler, whereas the steam engine and boiler use about half a pound. Steam plants also have "stand-by" loss, and need hours of warming up before starting, the Diesel burns fuel only when running. Diesels, however, cost more, and take more headroom.

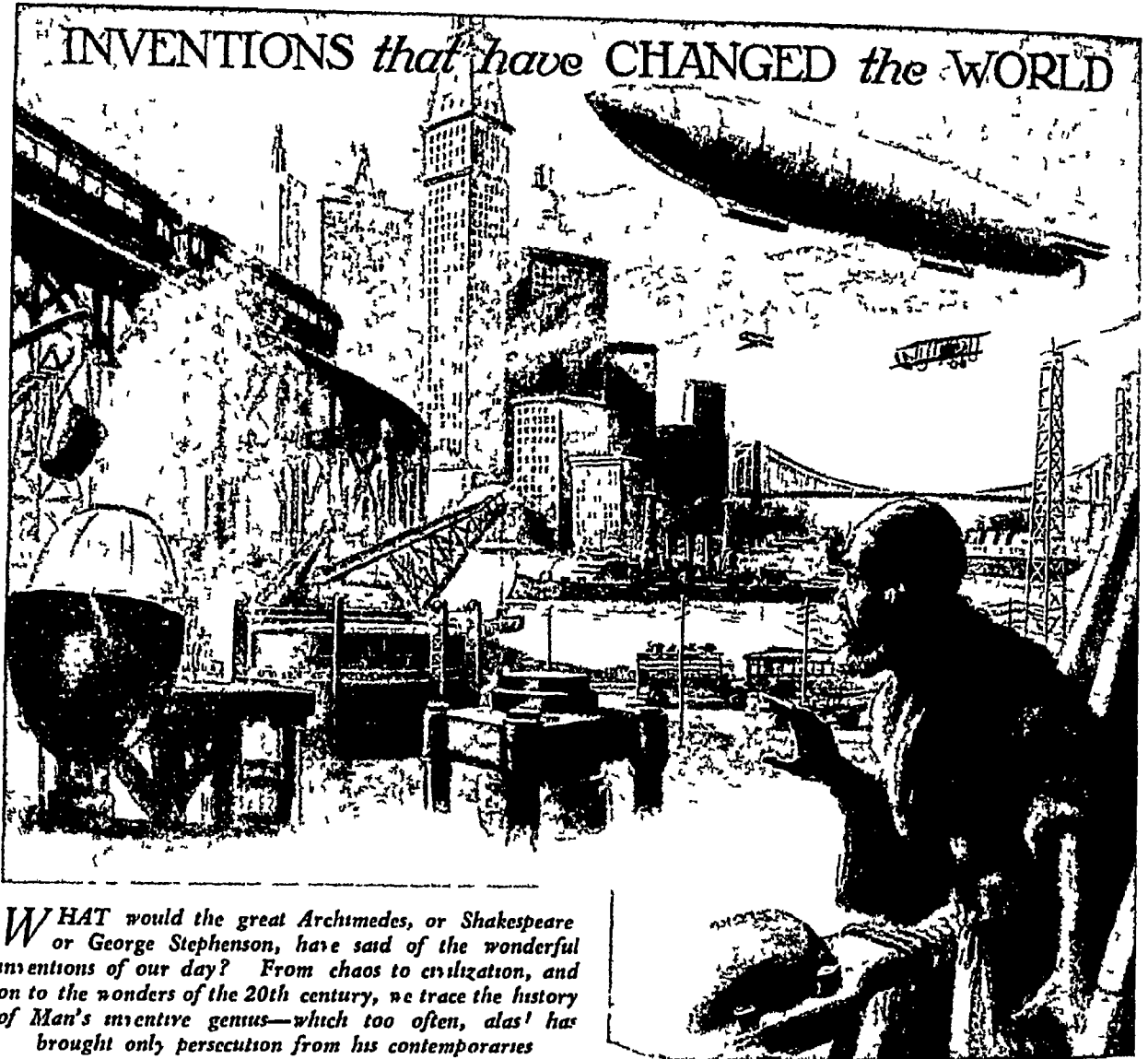
On land the Diesel has been found valuable in "Diesel-electric" units used instead of steam locomotives. The Diesel drives a generator which furnishes current for electric motors. Such units are used to drive some of the new streamlined trains and in shunting locomotives. The advantage is that the Diesel engines run always at the same steady speed and the actual control of engine speed is exerted over the electric motors. Tugs for heavy loads are now made with engines of this type.

Satisfactory Diesels have been developed for motor-cars and aeroplanes, including "semi-Diesel" types—that is, engines burning low-grade fuel but having sparking plugs. On airships they reduce fire risk and wireless interference, in addition to giving fuel economy.



CYCLE OF OPERATIONS IN A DIESEL ENGINE

Compare this simplified diagram of a four-stroke Diesel engine with that of the petrol engine in the opposite page. The first two strokes of the cycle are almost the same. The important difference is in the fuel intake and ignition. At the top of the second stroke the air in the cylinder is so highly compressed that its temperature rises to about 1000° F. When the fuel is injected, it ignites spontaneously, without the need of a spark. The rest of the cycle is similar to that of the petrol engine. Fuel of low volatility can be used, and these engines require little supervision.



WHAT would the great Archimedes, or Shakespeare or George Stephenson, have said of the wonderful inventions of our day? From chaos to civilization, and on to the wonders of the 20th century, we trace the history of Man's inventive genius—which too often, alas! has brought only persecution from his contemporaries

Inventions. In the strict use of the word, an invention is a mechanical contrivance through which we may realize our purpose more readily than before. In the prehistoric age Man invented speech, if we may call that an invention, fire, with its uses for heating, lighting, and cooking, tools, the axe, the knife, the plough, and such weapons as the bow, the sword, and the lance, the wheel, and pottery making, and easy land transport, and boats to row and to sail. These are prehistoric inventions which are found in many parts of the world. In some regions the following inventions had been made before the dawn of history: the smelting, working, and hardening of metals, irrigation through dams and canals, water-wheels, glass, bricks, writing, and the making of paper, etc. With the invention of writing recorded history begins.

It is remarkable that, when men had learned to write, for thousands of years they practically ceased to invent. Between 4000 B.C. and A.D. 1100 no invention was made equal in importance to the above, but only improvements in minor details. Ships were made larger, clothes were

made richer, but the real activity of Man was directed towards the things that writing made possible—namely, society based on written law, literature, history, science, and philosophy.

The third period in the history of inventions begins with the introduction of the magnetic compass about A.D. 1200, of gunpowder about the same time, and of printing about 1450. These may have been first invented in China, but the West discovered them independently.

Since then some of the great inventions have been the telescope by Lippershey (1608), the pendulum clock by Huygens (1657), a microscope by van Leeuwenhoek (about 1660), an improved steam engine by Watt (1769), spinning machinery by Hargreaves, Arkwright, and Crompton (1763–79), the power-loom by Cartwright (1785), gas lighting by Murdock (1792), the steamboat by Symington (1801), the railway locomotive by Stephenson (1814), the reaping machine by McCormick (1832), the photograph by Daguerre (1837), the electric motor and dynamo by Faraday (1831), the telegraph by Morse (1844), the sewing machine by Howe (1846), the telephone

INVENTIONS

by Bell (1876), the linotype machine by Mergenthaler (1884), the gas engine by Otto (1878), the safety bicycle by Sparley (1885) and commercial wireless telegraphy by Marconi (1895)

Other inventions on new lines were the motor car, the submarine, the aeroplane, the application of chemical analysis to every branch of manufacture and the means of making exact measurements. The first decade of the 20th century saw the invention of the thermionic valve, without which wireless communication could never have been brought to its present degree of perfection. (See Wireless)

The development of these fundamental inventions covers every field of modern life—the compound and turbine engine applied to railways and to ships, the numerous uses of oil engines, screw ships of iron and steel, oil and sugar refining, matches, the cotton gin, the circular saw, spring clocks, aniline dyes, spectacles, antiseptics, various serums for inoculation, galvanized iron, paper from wood pulp, unbreakable glass, machines for every purpose from the making of pins to the making of armour plate, the gramophone, the cinematograph. The list is endless and is ever growing, and at the root of practically all of these inventions lie the great advances in abstract science in recent times, made by scientists who sought only to increase the world's stock of knowledge, without thought of practical application or hope of gain. To protect himself against the secret of his work being stolen or misused by some unscrupulous person, an inventor can register his invention at the Patent Office. The only provision is that a specification must be supplied.

The general effect of inventions is a beneficent one, because they lighten toil and increase production. It is true that this beneficent purpose underlying new inventions has not always met with recognition in their initial stages. For example, when power-looms, spinning-jennies and the like were invented,

the hand-loom weavers and other humble operatives in Lancashire and elsewhere smashed the new machinery, under the mistaken impression that it would destroy their means of livelihood.

To appreciate fully the beneficial effect of mechanical inventions—which are only one branch of the subject—one has to bear in mind how enormously the populations of civilized countries have increased during the historical period. It is, for example, scarcely likely that there were more than three million people in Britain at the time of the Norman Conquest. Even as recently as 1801 there were only eight



A GREAT INVENTOR OF ANCIENT TIMES

When the Romans besieged Syracuse, the mathematician Archimedes (q.v.), who was a native of the city, lent his genius to its defence. He devised engines like this one for hurling rocks upon the Roman ships. The long and powerful spring lever was drawn back, a stone was placed on its spoon tip the trigger was released, and the missile hurried out like a pebble from a sling.

INVENTIONS

million people in England Today there are over thirty-seven million How could such a teeming population as this be employed and fed and clothed if there were no machines, engines, railways, steamships, telephones, telegraphs and all the other many inventions now employed in the production and distribution of the means of life? What applies to England applies with equal force to Europe as a whole, and to America and the other continents

How could the busy mills of Lancashire and Yorkshire exist if all their manufactures had to be laboriously made by hand, and if there were no steamships to carry these productions overseas to the far-away markets of the world? How could the business of London, or any other city, be carried on if everyone had to go hither and thither on foot, and there were no telephones? What kind of a country would this be if it took one ten days to travel from London to Edinburgh, as was once the case, instead of seven hours? How often should we taste meat if there were no refrigerating machinery on the ships which bring us beef and mutton from South America and New Zealand? How would we get our news from the ends of the earth if there were no submarine telegraph cables to bring it to us, or if, when it reached us, it had to be written out on parchment with

a quill pen before we could read it? How dark our homes and streets would be if there were no such things as gas and electric light!

As a matter of fact, modern life as we know it is made possible only by the circumstance that on every side of us, in the air above and in the earth beneath, by night and by day, mankind is aided and served by innumerable inventions, all of which have been created by the fancy and ingenuity of men

The story of many of our most notable inventions is far more wonderful than any fairy tale It is terrible now, when we are enjoying

the blessings accruing from manifold inventions, to think that many of the clever and devoted men who conceived them received only abuse and often violence for their pains, while not a few of them obtained no recompense whatever, but lived and died in friendless poverty in the garrets which served them as homes as well as workshops

On the other hand, there have been many inventors who made fortunes Esnault Pelterie, who invented the "joystick" for controlling aeroplanes, obtained nearly £300,000 damages in a French court against the French Government and others for using his invention without acknowledgment during the World War

When Mr Lister (afterwards Lord Masham), the great Yorkshire manufacturer and inventor, was trying to perfect his silk comb, he lost £150,000 in one year (1857) Even this did not discourage the lion-hearted inventor, and ultimately his perseverance was rewarded, and he produced a comb which turned silk waste, which he purchased for sixpence to a shilling a pound, into yarn which he sold at 23s a pound The same inventor's plush loom, after heartbreaking disappointments, ultimately made £200,000 a year for its owners

One of the most romantic things about inventions is the very

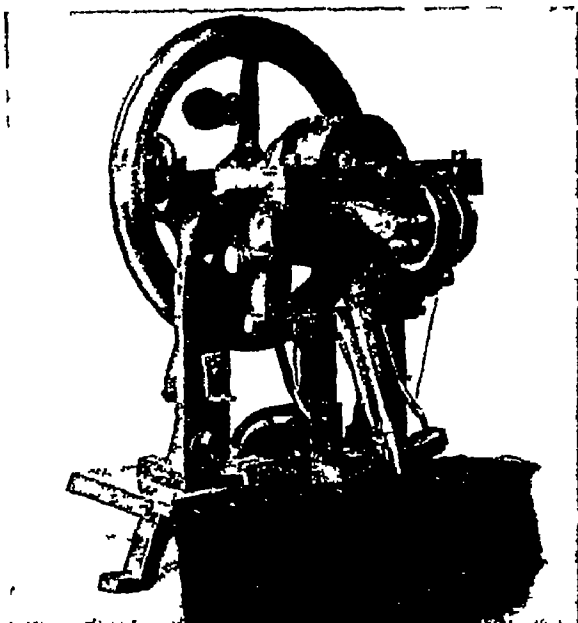
humble and discouraging beginnings of many improvements and conveniences that are now in use everywhere In 1792 an ingenious Scots man named William Murdock lighted his house and offices at Redruth with coal-gas of his own manufacture He was the first man to do so The first shop in London to be lighted by gas was situated at the corner of the Albany, Piccadilly, and the *Morning Post* of June 15, 1805, reported the incident as a wonderful event

But although the light was acknowledged to be far superior to either oil or tallow, the new illuminant met with great opposition People



FIRST HOUSE LIGHTED BY GAS

Imagine the astonishment of passers-by when they saw the windows of William Murdock's house in Redruth, Cornwall, gleaming for the first time with a brilliance that no candles or lamps could have produced! He made the gas with his own apparatus, and in 1802 illuminated a factory with gas-light.



AN INVENTION FOR THE HOME

The first lock-stitch sewing-machine was invented by Elias Howe and patented in 1846. The needle had a horizontal instead of a vertical motion and was eye-pointed, a shuttle on the underside of the cloth working in conjunction with the needle produced the lock-stitch.

From the model in the Science Museum, South Kensington

declared that the fumes from the gas lamps in the streets would kill the inhabitants, just as they afterwards declared that the smoke from railway locomotives would destroy the farmers' crops. Learned men said that if a gasometer were constructed it would require a weight as big as a mountain to hold it down, and prevent it soaring into the air like a balloon, and, further, that if forcibly held down, it might explode and blow the city to pieces.

In the Science Museum at South Kensington may be seen the first working model of Howe's lock-stitch sewing machine, patented in 1846. Yet even such an inestimable boon as the sewing-machine did not bring any gain to its inventor for quite a long time. In fact, at one stage Howe had to pawn the American rights of his invention, but ultimately the machine proved its utility, and he deservedly made a large fortune.

When one looks back at the amazing progress made by inventions during the past century and a half it seems almost unbelievable. It was only in 1825 that the first steam railway was opened between Stockton and Darlington. The first "motor-car" was a little steam toy invented about 1785 by William Murdock, the same man who first lighted his house with gas. The first marine steam engine was invented in 1787 by William Symington. These are only three inventions out of hundreds which might be named, and so wonderful is the revolution which they have brought about in such a short time that it staggers the imagination to try to conceive the condition of things on this earth if the present century should produce as many new inventions as was the case during the 19th century. Indeed, there is nothing too wonderful for the inventive genius of Man to produce.

Inverness-shire. This great county in the Scottish Highlands stretches across the country from the Moray Firth to the Atlantic Ocean. It lies south of Ross and Cromarty, and west of Nairn, Banff, and Aberdeenshire, with Perthshire on its southern boundary. It is entirely a mountainous country, except for the low-lying land adjoining the shores of the Moray Firth, in the neighbourhood of the county town of Inverness. The county also includes several islands, including the curiously named Rum, Egg and Muck in the Inner Hebrides, and Harris (the north part of the island Harris and Lewis, which gives its name



BEAUTY SPOT OF INVERNESS-SHIRE

Alexander H. Beattie

Beaulieu Firth, near Inverness, a favourite resort of yachtsmen, flows out into the sea through Moray Firth. The opposite shore is in the county of Ross and Cromarty. In the distance, above Strathpeffer, can be seen Ben Wyvis, rising to a height of 3,429 ft.

to the tweeds) and Uist farther out. The largest of them, however, is the incomparable isle of Skye, where the crofters still lead a simple life amid the most glorious natural surroundings.

A very interesting feature is the Caledonian Canal, which links up the waters of Loch Linnhe, Loch Lochy and Loch Ness (home of the mysterious "monster"), thus providing a navigable waterway right across Scotland, over sixty miles in length. Some of the highest mountains in the United Kingdom are situated within Inverness-shire including the monarch of all, Ben Nevis (4,406 feet). At its foot is Fort William, a favourite tourist centre. A modern touch has recently been added to the immortal grandeur of the mountains by the completion of hydro electric works in connexion with a power scheme.

The town of Inverness, "capital of the Highlands," is situated on the river Ness, and has an ancient history, having been a royal burgh since the 12th century.

One of the principal buildings is St Andrew's Cathedral, a handsome modern structure. Six miles from Inverness (the population of which is 22,000) is situated Culoden Moor, where the English, under the Duke of Cumberland, inflicted a crushing defeat on Prince Charles and the Highlanders (April 16, 1746), which finally destroyed the hopes of the House of Stuart.

The area of Inverness-shire is 4,210 miles and its total population about 82,000.

Iodine. The drug iodine and its many compounds are used in the internal treatment of rheumatism, pleurisy, Bright's disease, asthma, bronchitis, goitre, and in chronic lead and mercury poisoning. Iodine is used in many forms as a disinfectant and antiseptic, and, as a counter-irritant, it relieves pain and congestion. Iodoform, which produces the unpleasant, sweetish odour encountered in hospitals, is a compound of carbon, hydrogen, and iodine used as an antiseptic in surgical dressings.

Iodine is the essential constituent of thyroxin, the active principle of the thyroid gland, and a deficiency of iodine tends to promote goitre. Iodine occurs in seaweed, sea water, and fish, and in the air about salt water. There are, generally, few goitre cases near sea coasts or among people who eat considerable sea food.

Most of the world's iodine comes as a by-product from the nitrate beds of Chile. Commercial quantities of iodine are secured from seaweed in France, Scotland, Ireland, Norway, Japan and Java. The seaweed, or kelp, is collected and dried in the open, usually on the shore. It is then burned in shallow troughs

lined with pebbles from the beach. The resultant "ash," in the form of brittle slabs, is now the raw material from which iodine can easily be extracted.

Iodine is known in chemistry as one of the four halogens, the others being chlorine, bromine, and fluorine. Its chief compounds, called iodides, are formed with various metals. Pure iodine is a crystalline substance which turns to heavy purple vapour when heated to 184° F. It was discovered in 1811 by Bernard Courtois, of Paris, who was treating seaweed to get saltpetre for the manufacture of gunpowder for Napoleon's army.

Iowa. Iowa comes first among all the States of the U.S.A. in the production of wheat, pigs and horses. The region has repaid many times over the price

demanded for it by Napoleon under the "Louisiana Purchase" in 1803. Along the eastern boundary flows the great Mississippi, on the west is its tributary, the Missouri, while through the centre of the rolling prairies runs the river Des Moines. The capital town of the same name (population, 142,000) lies on this river. Population of state, 2,470,000, area 57,000 sq miles.

Iphigenia. (Pron if-i-jen-i'-a) The hero Agamemnon had angered the goddess Artemis, who in return caused a calm which detained the Greek fleet in Aulis when the Greeks wanted to sail against Troy.



IPHIGENIA OF GREEK LEGEND

The ancient story of Iphigenia and her escape from sacrifice was the subject of two plays by Euripides, and has also inspired many artists. This painting by the German artist Feuerbach shows her when she had become a priestess.

A seer told Agamemnon that the only way he might propitiate Artemis was by sacrificing his daughter, Iphigenia, and to this Agamemnon was forced to agree. But when Iphigenia was on the point of being sacrificed, Artemis substituted a stag for her, and carried her off in a cloud to the Crumena, where she became her priestess.

While Iphigenia was serving as priestess to Artemis, her brother Orestes and his friend Pylades came to carry off the image of the goddess, which was believed to have fallen from

heaven. They were taken prisoners and were to be sacrificed, but Iphigenia recognized her brother, and fled with him, taking the statue of the goddess, to Attica, in Greece.

Iphigenia occurs many times in the pages of Greek literature, and Aeschylus, Sophocles, and Euripides have all written plays about her. The German poet Goethe also wrote a play called "Iphigenia at Aulis." Gluck and Strauss had resort to the ancient legend as a basis for musical compositions.

ANCIENT PERSIA *under a* NEW NAME

Like all the other mighty empires of the past, Persia retains only a memory of its former glory. But, in our day, it is developing new industries and may yet experience a great revival under its new name of Iran.

Iran. (Pron i rahn)

Of the great Persian Empire that 25 centuries ago extended from the Indus to the Danube and from the Oxus to the Nile, only the western half of the Iranian plateau remains to modern Persia—a region about three times as large as France. The ancient name Iran, by which the Persians have always called their country, became in 1935 its official name, replacing "Persia," which was derived from a small province Pars (now Fars). And its change in name may

Extent—North to south, about 860 miles, east to west, 1,385 miles. Area about 628,000 square miles. Population, estimated at 15,000,000.

Physical Features—Western half of Iranian plateau (general altitude 3,000 to 5,000 feet), crossed by numerous mountain ranges (Mt. Demavend, 18,600 feet). Salt and sandy deserts cover about two thirds of the plateau area. Salt lakes Sistan and Urmia. Caspian Sea on north Iranian (Persian) Gulf and Gulf of Oman on south only navigable river, Karun.

Principal Products—Wheat, barley, cotton, tobacco, rice, fruit and nuts, silk, opium, gums, wool and hides, iron, copper, tin, lead, coal, petroleum, turquoises, salt, etc., rugs and carpets, attar of roses.

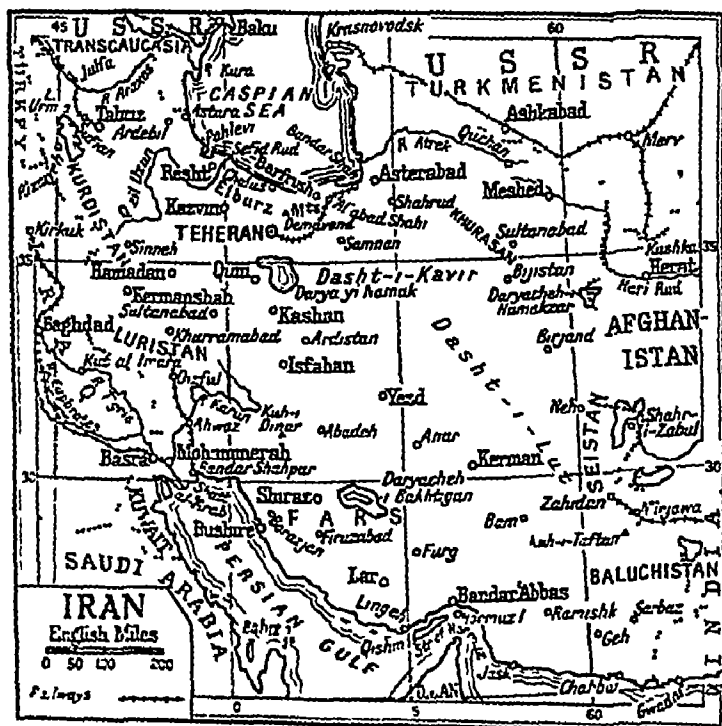
Chief Cities—Teheran (capital about 360,000) Tabriz (219,000), Meshed (139,000) Shiraz (119,000) Isfahan (100,000) Hamadan (99,000) Resht (89,000) Kermanshah (70,000) Kazvin (30,000).

mark a new era for this old land, which is just beginning to emerge from centuries of backwardness that followed the decline of its ancient glory. The old industries that gained Persia such fame in the past are of course, still practised, though the work suffers nowa days, perhaps, by lack of inspiration and mere repetition of worn patterns. But

Iran's future must lie rather with modern industry, particularly in the development of her oil wells, if she wishes to take again her place among the more important countries of the Near East.

Today Persia, "the land of the Lion and Sun" is by most of the world thought of as a country out of which come beautiful things—Omar Khayyam's poems and countless legends and fables, "Persian" rugs, usually in exquisite flower patterns woven of silk or of wool, attar of roses from the gardens of Shiraz, and turquoises from Nishapur. For the collector it means old porcelains having a rare apple-green glaze, and manuscripts illuminated with delicate miniatures of turbaned princes, flowering trees, and dancing gazelles, so faultless that there may be hundreds of figures in one square foot of battle scene, all of which will stand scrutiny with a magnifying glass.

Persia has been sung by the poets as the land of luscious fruits





At Kerman are manufactured some of the most beautiful Persian rugs. Forty miles west of Meshed, in a fertile plain, lies Nishapur, the birthplace of the poet Omar Khayyám.

It is in the western part of Iran that you will find most of the great cities, including those that have been capitals in ancient and modern times. Here are Susa and Ecbatana, now Hamadan, the cities one reads of in Xenophon. Susa is the ancient "Shushan," where the story of the book of Esther is laid. Here, too, is Shiraz, the city of wine, rosewater and attar of roses, and 35 miles east lie the ruins of Persepolis, the great city that Alexander destroyed in 331 B.C. These ruins are among the most important that have survived from the ancient days of Iran. Isfahan (or Ispahan), once a capital, lies in the centre of the habitable part of the country, in a pleasant fertile plain.

Tabriz is an important commercial centre and the terminus of the railway from Tiflis. Teheran (native name Tehran), the modern capital, lies at the foot of the Elburz Mountains, only 70 miles from the Caspian Sea. The city, to which the traveller slowly climbs by horse-drawn carriage, lies at an altitude of 4,000

and yet the Iranian plateau, which it shares with Afghanistan and Baluchistan to the east, is a high and region more than two-thirds desert.

To enter Iran (as we should call it) is like climbing a ladder, whether you come across the Caspian Sea from Russia, or follow the old caravan trail from Trebizond, or sail up the Tigris and take the older and steeper trail between Baghdad and Kermanshah.

In one-third of Iran nothing could ever be made to grow. The great salt deserts, or Kavirs, occupy the greater part of the eastern provinces. Across the salt deserts and the adjoining sandy deserts stretches a line of oasis towns like stepping-stones—Meshed, the most hallowed spot for Mahomedans in the whole of Iran, then Tabas, then Yazd, in the very heart of the country, and important for its silk manufactures and opium trade, then Kerman



SCENES IN THE IRAN OF TODAY

The city of Kum in Iran is visited every year by thousands of pilgrims who go to worship at the golden-domed shrine of the sainted Fatima, favourite daughter of Mahomet. The top photograph shows the gateway to the shrine. It is of beautiful design and workmanship. Below are men of one of the nomadic tribes of Turkish origin who inhabit Khorassan. They spend the warm months in the uplands, and in the cool season move down to the plains.

Photos Sir Percy Sykes

feet, overlooked by the snowy peak of Demavend, the highest mountain in Iran. The air is dry and bracing, and you can see for almost unbelievable distances. Teheran has a beautiful gate of coloured porcelain tiles, and all the better houses have high-vaulted underground rooms. A city once dull and dismal is being gradually transformed into a real capital.

During the past 50 years the rulers, or shahs, have made various attempts to modernize

IRAN

Teheran A tramway line was built, and in recent years several modern buildings have been erected. The typical Iranian commodities, rugs, dried fruits, jewels, and grain, do not suffer much in being carried hundreds of miles along the roads and trails that connect the bazaars of Teheran with the rest of the world, but anything more easily damageable in transit suffers considerably. The water supply is brought by canals from the mountains, it is sufficient in winter, but usually runs short in summer when it is most needed.

About one fourth of the people of Iran are city dwellers, and another fourth are nomads. These nomads tend their flocks and herds in the grassy valleys and on the slopes of the mountain ranges, and prey upon the peaceful communities for agricultural supplies.

Half the people are peasants, tillers of the soil, and this in spite of the fact that only three or four districts of Iran are naturally fertile. The most important agricultural province is Azerbaijan to the extreme north west. There are also many isolated oases such as Shiraz and Ispahan.

In most places the Iranian peasant can wrest crops from the soil only by irrigation, and irrigation is not the simple matter of canals and surface channels that it is in other countries. Having little rain and few rivers, he must use the mountain snows as they melt, and must bring the water, often long distances, by tunnel—otherwise this source of supply would evaporate in the dry air.

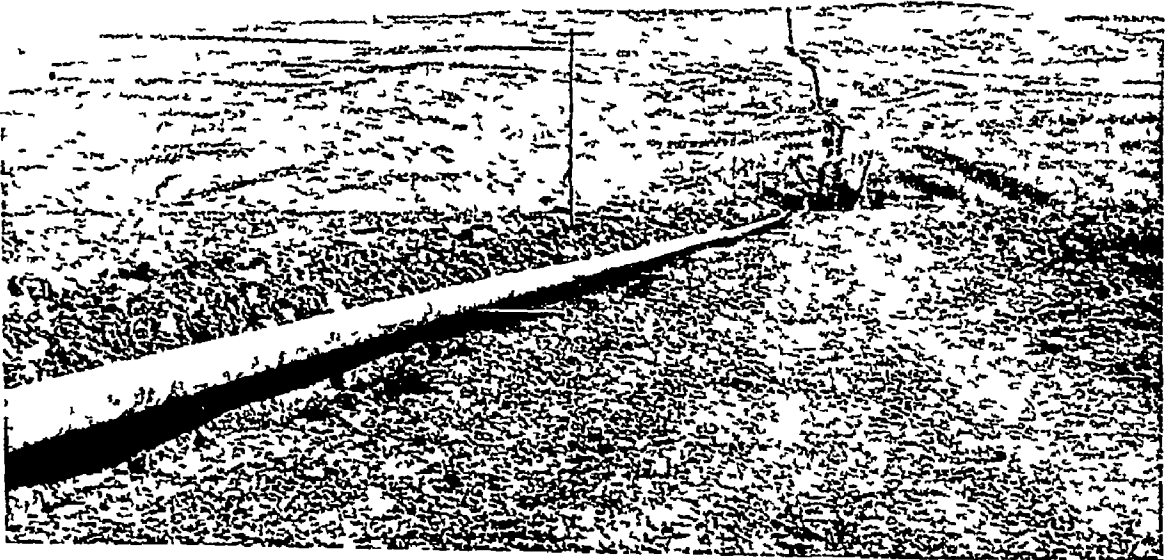
Beneath this barren land lies buried the key to Iran's future—oil. Vast petroleum fields

stretch from the Caspian Sea to the Persian Gulf. There are pipe-lines from the centres of exploitation, near Shushtar and Haft-Kel, to a refinery on the island of Abadan in the Gulf. The fields are now being worked by foreign capital, principally British. Copper, iron, tin, lead, rock salt and coal are found in large quantities, especially in the mountains of central and western Iran. Although some of these minerals have been mined for centuries, the methods have been primitive and it remains for modern engineering to develop these great resources.

Old Ways Still Hold Sway

Most of the people are Mahomedans of the Shute sect, and are inclined to look upon the innovations of western Christians with suspicion. Education is as yet a luxury enjoyed by few, but the European schools established in the larger cities are drawing an increasing number of pupils. Perhaps the western physicians and their hospitals have had a greater influence than the schools, for they are desperately needed. With sewage systems almost unknown, flies everywhere, water supplies unprotected from animals and refuse, it is little wonder that Iran is disease ridden.

The development of Iran was long held back by the official class, but in the decade just before the World War it had an awakening, largely through young Iranians educated in Europe, and Riza Khan Pahlevi, the Shah elected in 1925, has brought enlightened rule to Iran. To-day about 2,000 miles of motor roads are being built every year, and railways are also being extended. For the history of Iran, see Persia.



OIL CROSSES THE DESERT OF THE NEAR EAST

Both Iran and Iraq are rich in oil bearing deposits and such a view as this might be seen in either land. Actually it is of a section of the great pipe line, 600 miles in length, which has been constructed from Kirkuk in Iraq to the Mediterranean ports of Haifa in Palestine and Tripoli in Syria. Work was begun on it in 1932 and two years later it was opened by the King of Iraq. When the picture was taken sections of the pipe were being joined together.

A Living LAND of Dead EMPIRES

A country of the greatest antiquity is Iraq, though its name is new Civilization was born there, there Babylon and Nineveh flourished and faded, and its capital, ancient Baghdad, recalls more romantic but less busy days

Iraq. That cradle of civilization, the wide alluvial plain between the shifting beds of the Tigris and Euphrates, which for uncounted centuries has watched peoples and cities rise to

power and sink again into its shifting dust, is once more nursing an infant nation. This is Iraq, an Arab country formed from the land of ancient Mesopotamia (*qv*) and wrested in the World War from the rule of the Turk.

A strip of mountains and foothills and narrow green valleys borders Iraq on the north and north-east, near the boundaries of Turkey and Iran (Persia). The greater part of the country, however, is a drear monotony of flat desert and barren, rolling steppes, relieved only by a fringe of green along the twisting banks of the two great rivers that unite to form the sluggish Shat-el-Arab emptying into the Persian Gulf in the south-east. The silt of the two rivers has built a long alluvial plain and delta so fertile and fair to desert eyes that here legend places the Garden of Eden and one of Moslem's four earthly paradises.

Centuries of war and the shifting of the river beds have destroyed the irrigation systems which

Area—116,600 square miles estimated population (1932), 2,857,000

Physical Features—Desert area, relieved only by foothills and the valleys of the Euphrates and Tigris, which unite to form the Shat-el-Arab

Principal Products—Wheat, barley, dates, wool, oil.
Chief Cities—Baghdad (capital 260,000), Mosul (80 000), Basra (80 000)

made the fertile plain the seat of scores of cities now long crumbled into ruins. Plans to bring back the old prosperity by new canals, reservoirs and power-pumps lag because of the nation's

poverty. Yet good crops grow where water is available, and Iraq exports barley, dates, wheat, cotton goods, liquorice roots, sheepskins and wool.

Straggling towns dotting the river banks have none of the ancient grandeur of Babylon and Nineveh. Mosul, far up the Tigris, and the rich oilfields of the north were claimed by Turkey, but were awarded to Iraq by the League of Nations in 1926. Iraq is developing this wealth, and one pipe line runs from Kirkuk across the desert to Tripoli in Syria, and another to Haifa, a port of Palestine. The pipes are capable of taking up to 4,000,000 tons of oil, and were first used in 1934. Near Hit, on the Euphrates, are rich bitumen wells which furnish pitch to cover the bowl-like native reed boats.

The Arabs, who make up more than 90 per cent of the population, are about equally divided between the Sunnite and Shute sects of Mahomedanism. Karbala, Najaf and Samarra are noted Shute pilgrim centres. Strange religions

are those of the Sabians—star-worshippers, who live in river towns, for their ritual calls for running water—and of the Yezidis, who are devil-worshippers.

In Baghdad (*qv*), the capital, the depressing summer heat, often reaching 122° F., drives the people to the *serdab*, a cellar with a ventilating shaft, whose opening is turned to catch every breath of the north-west wind. On summer nights the inhabitants seek the roof for comfort, and find the shabby old city transformed by moonlight.



Major W J P Rodd

IN THE POTTERY DISTRICT OF BAGHDAD

Just outside the city of Baghdad, Iraq's far-famed capital, is the potters' village, where every sort of domestic utensil is made in forms that have endured for centuries. This photograph shows some buyers in their Astrakhan tarbushes inspecting the completed pots. On the right is the white-clad potter proudly surveying his stock.

IRAQ

At Basra native craft transfer cargoes to ocean vessels. Here the September "date wind," with its steaming breath of the Gulf, ripens the crop. Basra and Baghdad are ports on the air mail line between England and the East, and one of the country's few railways connects them. A desert motor transport line links Baghdad and Damascus, the cars passing long camel caravans on their way.

Among the ruins of the old irrigation canals on the lower river live the swamp Arabs in their reed huts. These swamp dwellers, safe in tiny hamlets on the islands between the tortuous channels whose secret they alone know, were never conquered by the Turks. They claim descent from the first dwellers of the plain, the Sumerians, and believe that the swamp districts where they live have remained there since the great flood of Biblical times.

The swamp Arabs, the city dwellers and the farmers are all scorned by the desert Arab, whose nomad life gives him a freedom unknown in the settlements. His only allegiance is to his tribe. He raids neighbouring flocks, or kills in his blood feuds, with little fear of the law.

Great Britain was given a mandate for the new nation of Iraq in 1920. King Feisal, an able Arab ruler, governed from 1921 until 1933, when he was succeeded by his son Ghazi. In 1930, a 25-year treaty of alliance with Britain was signed, providing for Iraq's independence after it had joined the League of Nations—which it did in 1932—but allowing Britain to retain air bases to protect her communications with her Far Eastern possessions. A treaty of friendship was also made with the kingdom of Saudi Arabia in 1936, and in 1937 with Iran, settling a long standing frontier dispute.

IRELAND

PAST & PRESENT of the EMERALD ISLE

Here is described the strange contrast of a lovely land of rich pastures and peaceful scenery—a place where prosperity could and should always reign yet with a violent history of cruel wars and senseless bloodshed

Ireland. A romantic history, alluring scenic beauty, the charm of a warm-hearted and impulsive people, indelible ties of blood and sympathy, and its political problems of recent times, give to Ireland an importance out of all proportion to its 31,840 square miles of area. It is separated from its sister

island of Great Britain by only 13 miles of water (North Channel) in the north, and 47 miles (St George's Channel) in the south, and its fortunes have been inextricably entangled for more than 1,500 years with those of its neighbour.

In surface Ireland is an inland plain, surrounded by a rim of low mountains. The climate is much like that of England, mild and temperate, but the winters are even warmer, and there is more rain. There are numerous rivers, of which the Boyne and Liffey in the east, the Barrow and Blackwater in the south, and the Shannon in the west are the most important. Lough Neagh is the largest lake in the British Isles, and the Lakes of Killarney, in the south-west, are perhaps, the most beautiful.

The population, of "Mediterranean" stock, represents two waves of Celtic peoples who came by way of England from the Continent. About

Extent—Greatest length (N E to S W), 302 miles, greatest breadth, 174 miles. Total area, 31,840 sq miles, total population, about 4,244,000.

Physical Features—Central plain surrounded by mountains. Highest peaks—Carrantuohill in the Macgillcuddy Reeks (3,414 ft.), Lugnaquilla in the Wicklow Mts (3,039 ft.), Galtee Mts (3,018 ft.), and Slieve Donard in the Mts of Mourne (2,796 ft.). Largest lake—Lough Neagh (150 sq miles), chief river the Shannon (240 miles long) flowing into the Atlantic.

Principal Products—Turnips, potatoes, mangels, flax, linen goods, ships, fish, cattle, horses, beer, whisky, bread and biscuits, dairy produce.

Chief Towns—Dublin (capital of Eire) 468,000, Belfast (capital Northern Ireland), 415,000, Cork (Eire), 80,000, Londonderry (Northern Ireland), 47,000, Limerick (Eire), 41,000.

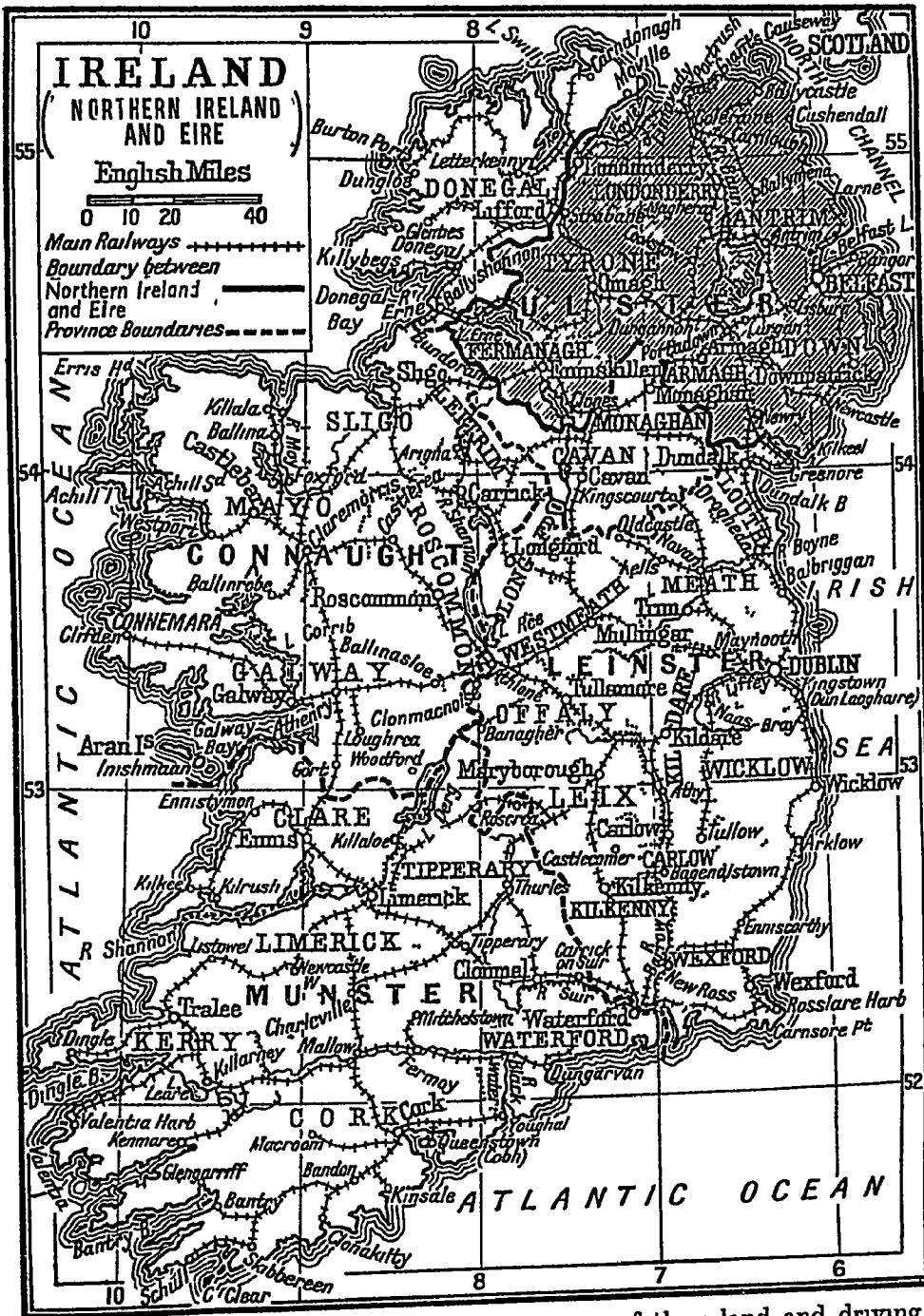
three-quarters of the people are Roman Catholics. While the northern counties (Ulster) are predominantly Protestant (mostly Presbyterian), the western and southern counties are almost entirely Roman Catholic.

Historic antagonisms even more than religion separate the Protestant Ulstermen from the Catholic

south. Economic differences also serve to divide the Emerald Isle. The Ulstermen are hard-headed men of business whose trade and manufactures have enriched their part of the country. They are accustomed of old to the monopoly of political power and to play the part of a ruling class. The south, on the other hand, is made up of a Catholic peasantry who are less progressive than their neighbours to the north. They cherish old traditions and old grievances, but they are essentially a kindly, generous, and talented people.

The land in Ireland is mostly leased in small holdings, averaging not more than 28 acres to a farm. The soil in most places is thin, and the rainfall so heavy that not much grain can be raised. Most of the country is given over to cattle-raising and dairying, potatoes are the staple crop. The climate makes the raising of

IRELAND



was much affected by English institutions, or (for centuries) adopted the English language. The rest of Ireland was long given over to clans who warred with one another and with the English. Irish habits and customs even invaded the "English Pale," as the colonized area about Dublin was called, and within a few generations English settlers within the "Pale" tended to become Irish in outlook and sympathy, in many cases "more Irish than the Irish themselves." The Reformation, which left Ireland unchanged in its Catholic faith while England broke with the Pope and set up a national Church, widened the breach.

The Tudor sovereigns began in the 16th century the policy of enlarging English influence by settling large "plantations" of English and Scots in Ireland, dispossessing the Irish peasants

of their land and driving them into the west. Further dispossessions went on under the first Stuarts, and whole tracts of north Ireland were taken from a desperate peasantry, to be given to Scottish settlers. Later, when Charles I of England had his hands full with the mutinous Long Parliament, Ireland rebelled and put to death thousands of the Protestant settlers (1641). Oliver Cromwell reconquered the country, and with such rigour that his name remains a byword of cruelty there. More land was taken from the peasants and given to the English, and indeed the "Cromwellian Settlement," as it was called, was the cause of most of the later troubles between the real Irish and the imported English "colonists," in spite of the measure of prosperity which it created.

flax profitable, and much of the north is given over to this crop which partially supplies the linen manufactures of Belfast. There is almost no iron or coal in the country, and there was no water-power development until the Irish Free State began the great Shannon electrification scheme in 1925. Despite these handicaps, the linen and shipbuilding industries of Belfast are world famous.

While the people of England were still barbarians, Ireland for a time possessed one of the most advanced civilizations in western Europe. This was the time of St. Patrick (died A.D. 461?) and of a flourishing Irish Celtic Christianity. Henry II, one of England's great kings, conquered the Irish in the latter part of the 12th century. But only the eastern part of the island

IRELAND

Then, when James II was driven from England in 1689, Ireland supported him because of his efforts on behalf of the Catholic religion. But with the aid of the Protestant north and an English army, William of Orange—who had become William III of England—defeated James at the famous Battle of the Boyne (1690). This meant the triumph of Protestant Ulster, or the "Orangemen," who for a century and a half exercised almost all power in Ireland. Catholics were debarred from voting or holding office, Catholic Church services were forbidden under penalty of death. Such legislation had the effect of intensifying the Catholicism of Ireland.

With the close of the 18th century, Ireland was induced to give up its separate Parlia-



CROSS OF REFUGE

In Ireland the glebe-land round a church was once a sanctuary marked by high crosses, under the arms of which fugitives might find protection. Here is one such, a 10th century cross at Monasterboice.

ment by the Act of Union with Great Britain (1800), but thenceforth it had representatives in the House of Lords and the House of Commons. In 1829 the last of the penal laws against Catholics—excluding them from Parliament—was repealed.

Next, in 1845, a blight destroyed the potato crop and there followed the terrible sufferings of the famine years 1846-47. England suspended and then repealed, when too late, the "Corn Laws" which hindered the free importation of grain. Thousands died from starvation and famine fever, and millions emigrated. From that time on the people have been leaving Ireland for other lands, until today it is said that there are four times as many Irish in the U.S.A. as in the whole of Ireland. Before

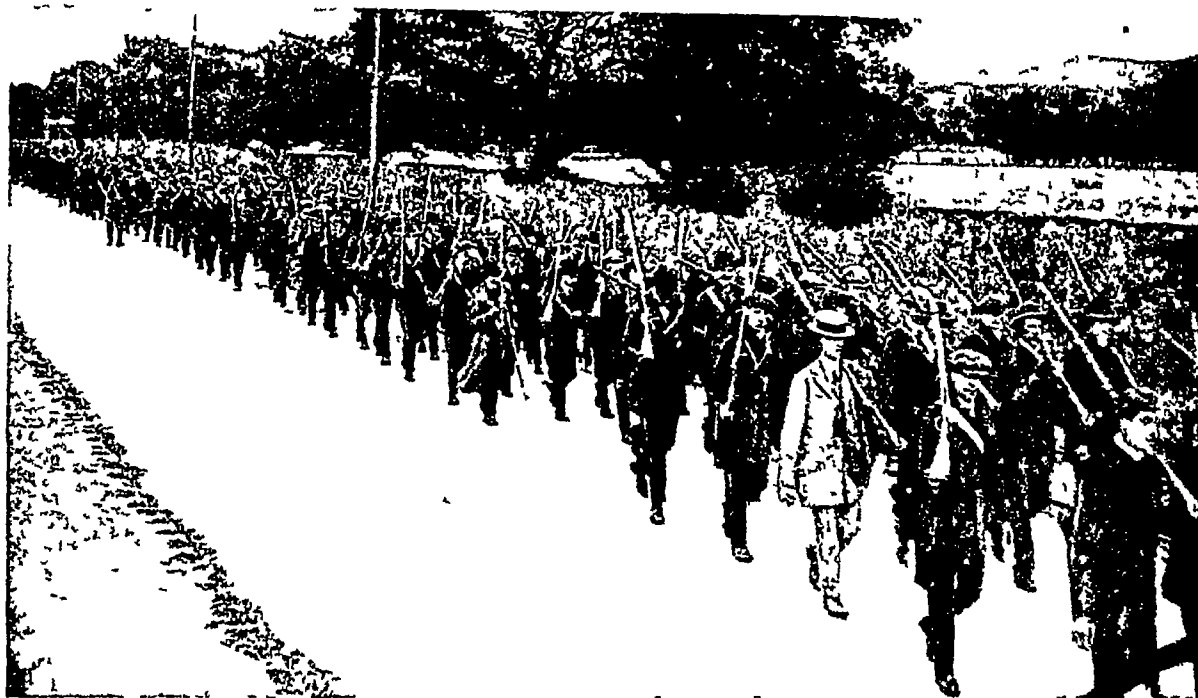


A SCENE FROM EIRE'S PAST IRISH EMIGRANTS TO THE WEST

After the conquest of Ireland by Cromwell his soldiers were granted the most fertile lands and hundreds of old Irish families found it impossible to cultivate the inferior tracts to which they were transferred. Most of the younger members of the former land owning families preferred indeed, to emigrate and from 1650 onwards scenes like the one shown here were no uncommon occurrence. This picture shows a party of young women leaving for the West Indies.

Top photo W. Lawrence lower from a painting by G. L. Muller in the Lyons Museum.

IRELAND



Sport & General

RIFLES FOR IRELAND ON THE EVE OF THE WORLD WAR

The introduction in 1912 of the bill providing for Home Rule for Ireland soon gave rise to a state of intense friction in Ireland between Northern Ireland, which desired to maintain the tie with Great Britain, and Southern Ireland, which wanted political freedom. Both parties started to arm in preparation for what might have been civil war, and in the summer of 1914 gun-runners were supplying arms and ammunition to both parties. On July 26, some 1,000 rifles were landed at the Hill of Howth, and the National Volunteers, here seen, marched openly to Dublin carrying them.

the great famine the population of Ireland was more than 8,000,000, but at the present day the population of Eire is about 2,970,000 and that of Northern Ireland about 1,250,000, and although emigration to America has been practically stopped, the young Irish men and girls still emigrate to England at the rate of 30,000 or more every year.

The last part of the 19th century saw an attempt on the part of English statesmen to undo old wrongs in Ireland. A law passed by Gladstone (1869) disestablished the English Church in Ireland. The rights of tenants were safeguarded (see Parnell, Charles Stewart), and money was spent freely to develop the resources and farming of Ireland and to enable the peasants to purchase their holdings. In 1886 and 1893 Gladstone attempted to restore Home Rule to Ireland, but even his great name could not carry the measure through Parliament. In 1898 the Conservative party gave Ireland a measure of local self-government, and other measures helped to improve conditions.

Yet the Irish continued to demand Home Rule. In 1912 Asquith brought into Parliament the third Home Rule Bill. Ulster feared that an all-Irish Parliament would discriminate against its religion and against its industry, and Ulster disliked also to give up its privileged position in Ireland. But the Home Rule Bill became law soon after the World War broke out in 1914. By another act, however, its operation was postponed until after the war,

and John Redmond, the conciliatory leader of the Irish Nationalists, died in 1918 with Ireland's hopes unfulfilled.

The attempt of Sir Roger Casement to bring German aid to Ireland (for which he was condemned and hanged), and the trial and execution of 14 leaders of the unsuccessful Easter Rebellion of 1916, further widened the breach between England and Ireland. Leadership more and more fell into the hands of the Sinn Féin (Pion shin-fân, meaning "ourselves alone"), a revolutionary party which proclaimed Irish independence, organized an Irish Parliament, and openly tried to make Ireland an independent republic. The passage by Mr. Lloyd George of a new Home Rule Bill, establishing one Parliament for Ulster and another for the rest of Ireland, did not satisfy the Irish party. Never before was the Irish question so acute.

The Ulster Parliament was opened, however, in 1921, and a conference was arranged in London between Irish republican delegates and members of the British Cabinet. After negotiations extending over nearly three months, a treaty was signed on December 6th giving Ireland full dominion status in the British Empire, under the name of the Irish Free State, with a Parliament and Executive of its own in Dublin, while Northern Ireland (six counties in Ulster) still held to British allegiance. In 1938 the Free State was renamed Eire. For the history of Ireland since 1921, see the separate articles on Ireland, Northern, Irish Free State.

BRITAIN'S REALM *in* IRELAND'S ISLE

The only remaining part of Ireland within the United Kingdom is the small north eastern corner This little land bears strong contrasts with Southern Ireland in its industry and people, as well as its political loyalties

Ireland, NORTHERN When most of Ireland was demanding Home Rule, six of the nine counties in the province of Ulster opposed all attempts to separate them from the United Kingdom Two thirds of the people in this region are Protestants, most of them descendants of the Scottish and English colonists who were "planted" in ancient Ulster in the 17th century They have remained essentially British, and they preferred to keep their status as part of the United Kingdom rather than to become a small Protestant minority in a predominantly Catholic united Ireland

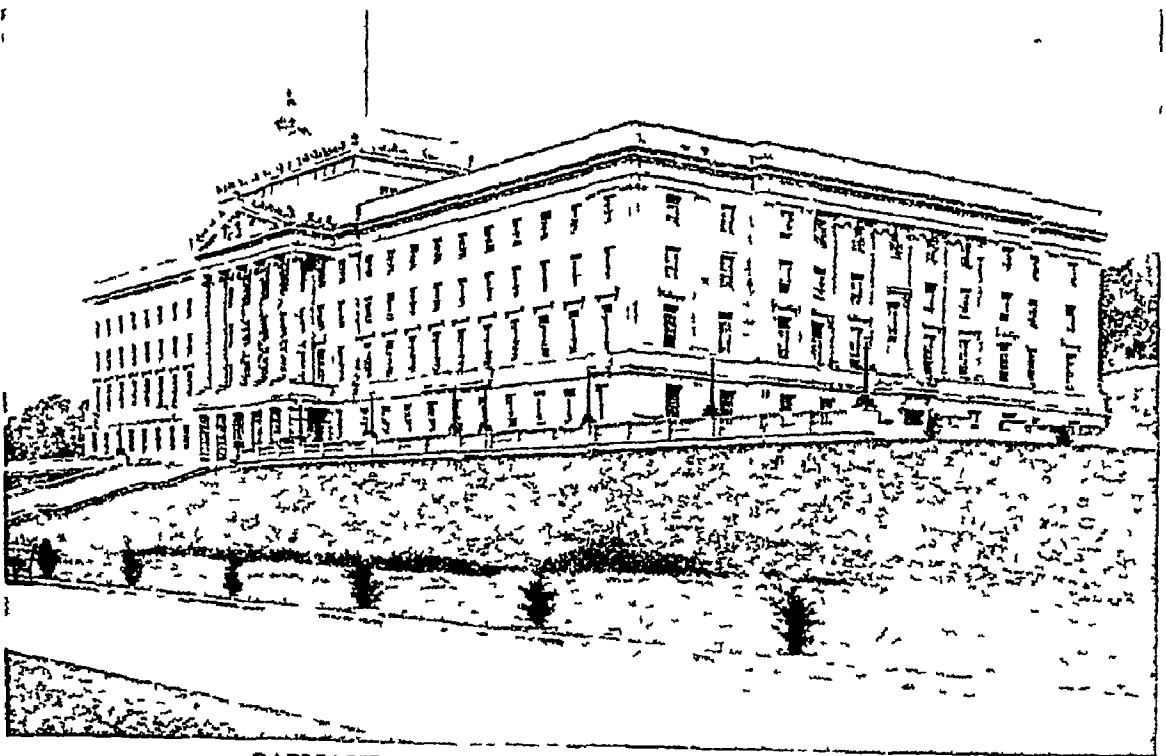
These six north east counties—Antrim, Down, Armagh, Fermanagh, Londonderry, and Tyrone

—together make up only one sixth of Ireland They have an area of 5,237 square miles The country is rolling, with rounded hills which are a continuation of the Scottish Highlands Large sections of land are used for grazing, for the livestock industry is the most important branch of agriculture in Northern Ireland Cattle, sheep, pigs, and poultry are raised for local and English markets, and dairying is a considerable industry Although there is comparatively little level land, more than a fourth of the total area is devoted to crops Hay is grown on nearly half of this acreage and oats on nearly a fourth of it Most of the remainder is in potatoes, turnips, flax, and fruit A large percentage of the farms are holdings of thirty acres or less

Agriculture, however, is not the chief industry, as it is in the Irish Free State, for the greatest manufacturing region of Ireland centres about Belfast (*qv*), the capital of Northern Ireland and its busiest seaport In this parliamentary borough and its neighbouring towns are concentrated more than half the population of



Walker Monument,
Londonderry



PARLIAMENT BUILDINGS OF NORTHERN IRELAND

Belfast, the capital of Northern Ireland, boasts many fine buildings, but its chief pride is the new Parliament House which contains not only both houses of Parliament, but a number of Government offices It stands in Stormont Park, an estate of about 300 acres, just outside the city on the Newtownards Road. The foundation stone was laid in 1928 and the buildings were opened four years later The photograph shows the imposing façade overlooking the park.

Photos J Dixon Scott Topical

IRELAND, NORTHERN

the six counties Londonderry, the second city, is also a manufacturing centre and a seaport. The chief industry in both cities is the manufacture of linen, which employs about one third of all the country's factory workers. Some of the flax is home-grown, but the greater part is imported from Russia, the Baltic States, and

milling and the manufacture of machinery, rope and twine, clothing, liquor distilling, tobacco, and soap. Herring and salmon are the principal fisheries. Clay, chalk, granite, and sandstone are quarried. There is no coal worth mining, and all the coal consumed is imported from across the Irish Sea.

By the terms of the Anglo-Irish Treaty of 1921, the six Unionist counties of Ulster remained a part of the United Kingdom. The other three counties joined the Irish Free State. The events leading up to this step are described in the article on Ireland.

Ulster's history after 1921 continued to be stormy. Within Northern Ireland itself, fierce dissension arose between the Protestant Unionist majority and the Catholic minority that favoured joining the Free State. Relations between Northern Ireland and the Irish Free State were difficult. Efforts of Free State leaders to bring the northern counties into the Free State were ill received, and a four-year dispute over boundary lines almost started a civil war. The Free State claimed the counties of Fermanagh and Tyrone and several border towns, which are predominantly nationalist and Catholic. In 1925, however, this difficulty was settled by agreement, and Northern Ireland retained the disputed territory.

Economic barriers, as well as racial and religious differences and political loyalties, prevent the union of the two Irelands. Northern Ireland's leaders are conservative, and they believe that the country's prosperity depends upon continuing to encourage the spirit of private enterprise on which its great industries were founded. Hence they dislike and fear the economic policies of the Free State, with its experiments in government control.

Northern Ireland has a considerable measure of self-government. It has a parliament consisting of a senate and a house of commons. The executive power is vested in a Governor-General appointed by the British crown. The Governor-General is advised by a cabinet of



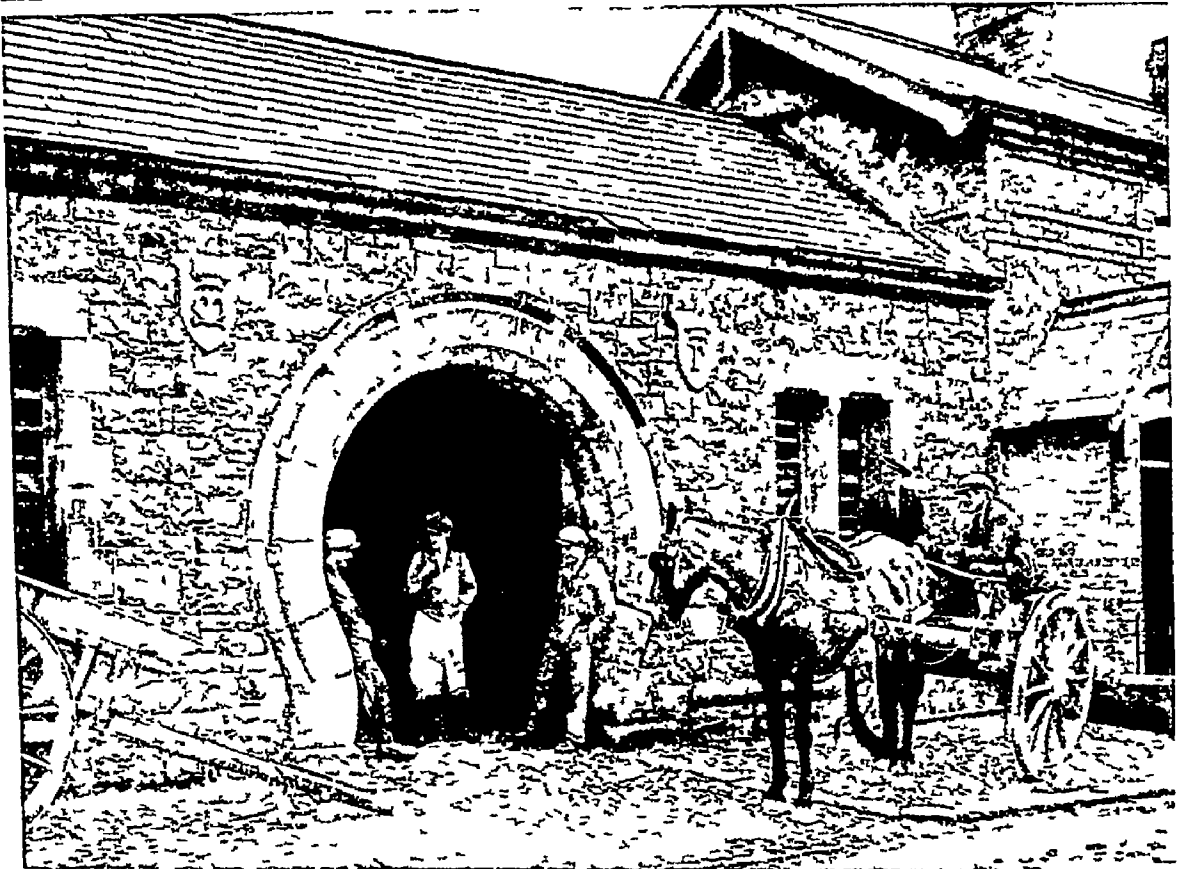
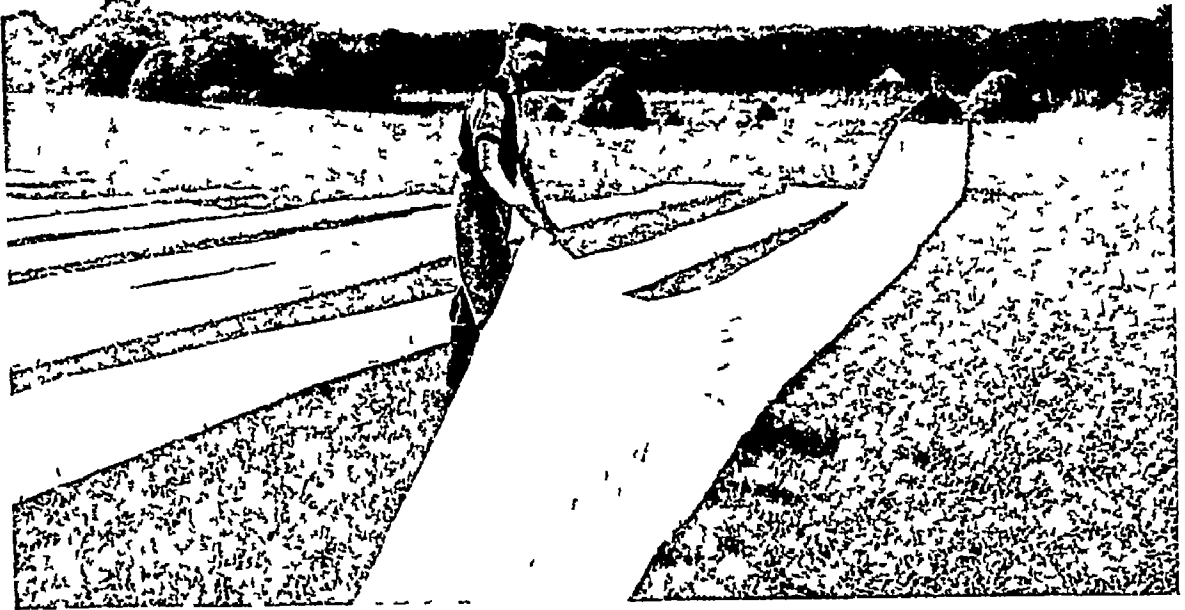
J. Dixon-Scott

IN BELFAST'S SHIPBUILDING YARDS

Many of the most famous liners in the world have been built at Messrs Harland and Wolff's great shipyard at Belfast, including the ill-fated Titanic. This photograph shows one of the slipways on which the biggest ships are built, with giant gantries 50 feet high for hoisting the framework into position.

Belgium, the manufactured goods have many foreign markets, especially the United States and Australia. Shipbuilding, the other leading industry, is centred at Belfast, which imports iron and coal from England and South Wales. There are many small industries, such as flour

FLAX AND FARRIERY IN NORTHERN IRELAND



Northern Ireland presents many contrasts. Its capital, Belfast, is a great manufacturing and shipbuilding centre. Not far away are fields of flax from which linen world-famous for its quality is made. In its manufacture the old processes are still used. In this field at Muckamore, Co Antrim, Irish linen is being laid out in strips to bleach, the linen is carted out wet and stretched out on the grass to be whitened in the sun. Below is another scene in Antrim. It is a village forge, a building of rough hewn stone, characteristic of Ireland, with a cobbled forecourt. The entrance is contrived in the shape of a horseshoe.

Upper Fox Photos lower J Dixon Scott

IRELAND

ministers, who are responsible to the local parliament. Certain legislative and financial powers are reserved to the British Parliament, to which Northern Ireland, as a part of the United Kingdom, elects 13 members. Population (1937), 1,280,000.

Iris. The bright-coloured flowers of the brilliant yellow "flag" are found in the early summerswaying in the breeze on their long slender stems along the banks of rivers and lakes and in gardens, for this is indeed one of our most characteristic summer flowers.

Although the yellow flag, which gets its name from the fact that it sways in the breeze like a banner, is the only wild iris found in England, there are 170 species, ranging in colour from white and yellow to deep blue and purple, found in other parts of the world. Indeed, to its



TWO TYPES OF THE LOVELY IRIS

Few plants have been so improved under cultivation as the iris. Although basically all the garden forms are the same, they differ enormously in appearance as well as in colour. Those you see above are, on the left, the Spanish iris, a dainty, rather stiff sort with narrow, spike-like leaves, and on the right, the grand German iris, whose spreading flower is set off by sword-like blades.

house. The fragrant orris-root, much used in making tooth-powder and pastes, is derived from the rootstocks of the Florentine species. The iris of Japan (*I. laevigata*) has been immortalized in many of the loveliest works of that country's artists. The iris is the principal member of its own order, *Iridaceae*.

varied hues the flower owes its other name, for Iris was the Greek goddess of the rainbow who carried messages between the gods and men. And apart from these, there are innumerable lovely varieties which have been bred for gardens, in every tint and colour under the sun.

From a white form of the iris which grows in southern Europe was derived the heraldic device of the fleur-de-lis, which Louis VII of France adopted as the emblem of the French royal

A REPUBLIC *within the* EMPIRE

The greater part of Ireland is included in the Irish Free State, the birth of which is described in the article on Ireland. In 1938 it adopted a new republican constitution, changing its official name to Ireland or Eire.

Irish Free State (Eire). "Home Rule," the dream of generations of Irish people, was realized in 1921, when the Irish Free State



Peasants of Old Ireland

(Saorstát Éireann) came into being as a self-governing dominion of the British Commonwealth of Nations. Perhaps no government born of 20th century struggle started with more handicaps or made greater progress than this new state.

Except the small section in the north-east which comprises Northern Ireland, all of Ireland—that is, the provinces of Leinster, Munster, and Connaught, and the three counties, Cavan, Donegal, and Monaghan, in Ulster—is included in the Free State's 26,600 sq miles. The people in its 26 counties have a lively sense of their differences from the people of Northern

Ireland and of Great Britain. The hills of ancient Connaught and the islands off the west coast shelter the descendants of the former Gaels. And the transplanted English here, unlike those in Northern Ireland, have become thoroughly Irish through adoption of Celtic ways.

The character of the land, its abundant rainfall, and its lack of raw materials for manufacturing, predestined Ireland to become an agricultural country, with stock raising as the chief industry. (See Ireland.) The animals raised in the Free State are still the chief source of its income. The area devoted to crops is being constantly increased, however, and so industries dependent on agriculture for their raw materials are being developed by the government in the effort to make the country less dependant on imports. The leading crops are oats, potatoes, turnips, barley, wheat, sugar beet, and cabbage. Great Britain has always been a market for the Free State's surplus beef, cattle, sheep, horses, pigs and poultry, as well as for dairy products and eggs and the famous Irish bacon. Potato growing and pig rearing go hand in hand on

RIVALS IN BEAUTY—THE IRIS AND THE MOTH



From photo by LANSWOOD M. CHACE Painted by J. M. FETTERLIN

See text overleaf



R. A. Malby

GARDEN IRIS AND WILD 'FLAG'

THE picture above shows the glory of a huge bed of irises, flourishing in all their beauty in a garden border. The tall, straight stems bear a wealth of the spear head buds, each of which opens into the lovely, soft-petalled flower we know so well. It is easy, too, to see why the wild iris of our waterways is called the flag, for that is just the impression you get from the big, colourful flowers. The colour plate overleaf shows a lovely individual iris, one of the garden types developed from the German species, *Iris germanica*. Though most wild sorts are yellow or purple, the breeder's skill has made this one red and pink and orange. Beneath it is nestling a great *Cecropia* moth. That the insect is as lovely in its own way as the iris you can see for yourself as it hangs, newly emerged, beneath the cocoon.

IRISH FREE STATE (EIRE)



DESIGNS THAT ADORN THE COINS OF EIRE

These entertaining and artistic figures of many of our animal friends appear on the coins of Eire, with a simplified modern style notable also in the George VI English coinage. From left to right we see above the hen and chicks on the penny piece, the Irish wolfhound on the sixpenny, a pig and litter on the halfpenny, a trim Irish hunter on the half-crown. The lower row shows a bull on the shilling, a hare on the threepenny piece, the harp which is stamped on the reverse of each of the coins, a leaping salmon on the two shilling coin, and a flying woodcock on the farthing. The designer made not only a beautiful picture of each animal, but he made it the best and truest of its kind from the point of view of the stockbreeder. Now the Irish farmer may pull a halfpenny from his pocket and see what kind of pigs he ought to raise to make the finest bacon while his shilling is a lesson in cattle-breeding. The design of the coins was selected after a public competition in which artists of several countries took part. Although Irish artists submitted designs it was the entry of an Englishman Percy Metcalfe of Yorkshire, which was chosen.

many small farms, because potatoes are excellent food for pigs. For more than two centuries dairying has been an important branch of the Irish farming industry, and there is a large demand for Irish butter in the British market. Most of the creameries are run on the co-operative plan.

The creation of small farms from large holdings, in progress for many years, has been speeded up by the government. Steps have also been taken to help the farmer to improve his products and to establish a better balance between agriculture and industry proper.

In the great bogs of the central lowlands quantities of peat are cut by hand, peat heats many an Irish home, for imported coal is expensive. Fish has never been a popular food with the Irish people, as it has with the English, but the government of Eire is trying to make fishing a major pursuit. Herring and mackerel are the chief products of the deep sea fisheries, and salmon is the most important fresh-water fish. Shellfish—crabs, crawfish, lobsters, and oysters—are abundant.

Power from the Shannon

Industry has made good progress in Eire, for it is stimulated by the government's dream of economic independence. Lack of coal had always been a serious handicap, but the completion of a large hydro electric plant on the Shannon in 1929 made manufacturing practical. In 1932 the government gave great impetus to manufacturing of all kinds by offering loans and establishing high protective tariffs so that

industry might depend more on the country's agricultural products for raw materials. Increased production of wheat demanded additional flour mills, and by 1934 practically enough flour for home needs was being milled, though a considerable part of the wheat used was imported. Sugar factories using home-grown beets have cut down sugar imports to a minimum. More than half of the country's boots and shoes are now of local manufacture. Other industries include brewing and malting and the manufacture of tobacco, clothing, etc.

Factories are widely distributed through the country, in line with the government's policy to prevent concentration in one or two areas and to provide spare-time occupations for the farmers. The population is mostly rural, and the only cities of any size are the seaports Dublin (in Gaelic, Baile Atha Cliath), the capital and largest city, and Cork, the second city in size, with its outport Queenstown (Cobh), owe their growth chiefly to trade with Great Britain. Their industries, however, are increasing. Limerick (Lumneach) is the chief western port.

Education is free and compulsory for children under 14. The government has stimulated a revival of the Gaelic language, and in 1936 made it the language of instruction in the elementary grades. Dublin, Cork, and Galway have branches of the National University.

The Irish Free State came into existence in 1921 with the signing of the Anglo Irish Treaty (see Ireland). A provisional government headed by Arthur Griffith and Michael Collins took over

IRISH FREE STATE



JAUNTING CAR OF THE IRISH SOUTH-WEST

Here is one of the famous Irish jaunting cars, with its side seats over the wheels, coming down the river road near Skibbereen, at the extreme south-west point of Ireland. As you can see from the smiling country-side and the stone bridge, this part of Ireland deserves its reputation for picturesque beauty. Not far away, indeed, are the Lakes of Killarney, the most famous beauty spot of the Emerald Isle.

Dublin Castle in January 1922, and Ireland hailed the departure of 60,000 British troops. But the Free State had stormy sailing from the first. Already at odds with Northern Ireland (*see* Ireland, Northern), it was plunged into civil war—remembered by all Irishmen as “The Troubles”—by Eamon De Valera and his followers, who were insisting on the formation of a republic.

The “Irish Irregulars” seized and destroyed the Four Courts at Dublin, and much other damage was done. Griffith died in August, and ten days later the rebels shot down Michael Collins—perhaps the one man who could have brought peace to the country. In the ensuing fury of indignation William Cosgrave, a Free State champion, was chosen to succeed Michael Collins.

In October the Dail Eireann (Irish assembly) framed a constitution, under which Cosgrave was made president of the executive council, an office that corresponds to that of prime minister in other governments.

Building Up the New Country

The task of restoring order was a difficult one, but the new government was at last free to lay the foundations for the new State. A protective tariff was adopted, a tax bill was passed, courts were established, and many measures were taken to improve economic conditions in the country. In 1923 the Free State became a member of the League of Nations.

Not the least of Cosgrave's accomplishments was the building of the hydro electric plant on the Shannon. But his government was unpopular, chiefly because of its vigorous enforcement of the law, its high taxes, and its policy of drastic economy. As a result, he was defeated by De Valera in the general elections of 1932, and the latter now became president. De Valera at once began to take steps leading toward complete independence from Great Britain, although he held that a united Ireland should come before a free Ireland. The oath of allegiance to the crown was abolished, and in 1935 Free State citizenship was established to supplant British citizenship. The new government proceeded to map out an extensive programme of



A PEASANT TYPE

Wearing a dress of Irish homespun and seated at her spinning wheel, this old lady is a typical member of the Irish peasantry.

IRISH FREE STATE

social as well as political and economic reform, including unemployment relief, housing, etc

One of De Valera's measures led to a bitter tariff war with Great Britain. He refused to continue to pay to Great Britain the land annuities. These are instalments from the Irish farmers who are buying their land under the land purchase acts passed by the British parliament between 1897 and 1901. De Valera claiming that Great Britain never had a right to the land, retained the payments in the Irish treasury. To collect the money due, Great Britain levied a heavy duty on Free State imports and established quotas on cattle. De Valera retaliated with a prohibitive tariff on British imports, particularly coal. In 1935 a "coal cattle" agreement was made on a basis of mutual concessions.

The constitution of 1922 had created a parliament comprising the Dail Eireann and the Seanad (senate), with a president of the council (cabinet) chosen by the Dail. A governor-general, representing the British crown, gave assent to bills passed by Parliament. In 1936 the senate was abolished, as well as the office of governor-general.

In 1937 a new constitution was proposed by De Valera and approved by a majority of the people, providing for the election of a President who will be apart from party politics, and a new type of legislature—a Dail, and a senate partly elected by the Dail and other bodies. The name of the State is changed from *Saorstát Éireann* (Irish Free State) to *Éire* (Ireland) and is proclaimed a "sovereign independent, democratic State." Population nearly 3,000,000.



IN Tipperary is a hill shaped very much like a peaked nightcap. Near the top of it is a pasture where once, the tale runs, a herdsman watched over his cows. Now this hill had long been a playground for the fairies, and they loved it for the velvety grass and the broad leaved bushes on which they could dance. The Little People were angry indeed when cows trampled on it and ate up all the green carpet off their playing ground. Even the lowing of the herd sounded sad in their ears. Something had to be done about it, or the fairies would have no spot to meet on moonlight nights. So the Fairy Queen decided to frighten away the stranger and the great beasts with long horns, hard hoofs, and loud bells.

Night after night while the moon shone brightly on the hill the Fairy Queen would suddenly bob up before the lonely herdsman, now in one frightful shape and now in another.

For a Fairy Queen can do just such things. Sometimes she would be a great horse with eagle's wings and a dragon's tail, then, quick as a flash, she would turn into a little lame man with a flaming bull's head. Then she would be a terrible ape with a turkey's tail and duck's feet, with such roaring, hissing, bellowing, and howling as was never heard in this world before or since. And the poor herdsman, who could neither stir nor close his eyes, had to watch these horrible sights until his chattering teeth almost fell out of his mouth, and his hair lifted his hat almost half a foot from his head. And the poor cattle scrambled about like mad until the sun rose. Then the Fairy Queen departed.

Never a night passed but that the same thing happened. The cattle, half mad, kept falling into pits or tumbling into the river. And no



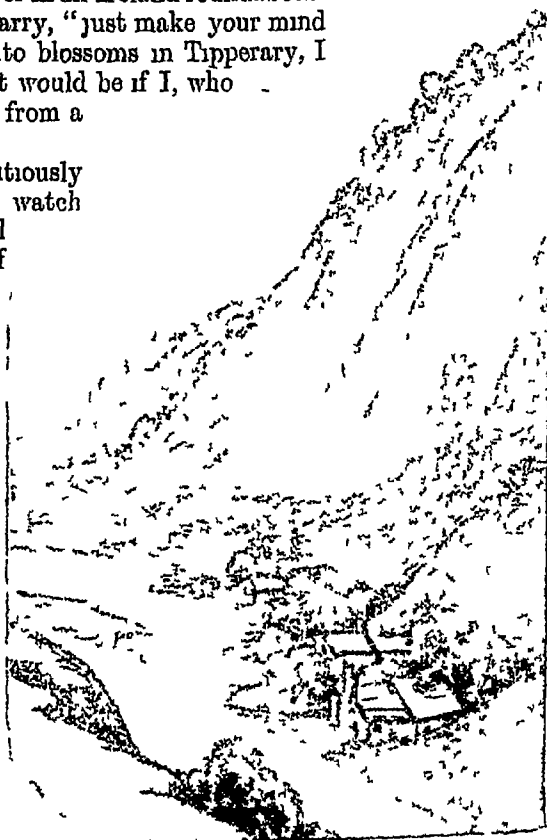
herdsman would tend them at night, even when the farmer who owned them offered ever so much money. But the faeries were happy, for now on moonlight nights they could come back to dance and gambol, to sip dewdrops from acorns, and to spread fairy feasts on mushrooms.

One day the farmer told his troubles to Larry Hoolahan, who feared nothing, and who played on the pipes better than any player in all Ireland roundabout. "Shure, an' if that is what ails you," said Larry, "just make your mind easy. Were there as many faeries there as potato blossoms in Tipperary, I would not fear to face them. A quare thing it would be if I, who never feared a grown man, should turn and run from a fairy brat not the bigness of a thumb!"

"Whist, Larry," said the farmer, glancing cautiously around him, "do not talk so bold! But if you watch my herds for a week on yonder hill you shall sup from my broth until the sun has burned itself down to the bigness of a farthing rushlight."

After striking the bargain, Larry hurried to the hilltop just as the moon was beginning to peep over its brow. Seating himself on a big stone with his back to the wind he began to play on his pipes. Presently Larry heard the voices of faeries upon the breeze, and one of them saying with a laugh, "What! Another rash man upon our fairy ring! Go, Queen, and make him repent!"

Then Larry felt them flying past his face like a swarm of midges, and, looking up, he saw a great black cat standing between him and the moon, on the tips of its claws, with its back up, as it mewed with the voice of a water-mill. Pretty soon the cat swelled up towards the sky, turned round on its left hind-leg, and began to whirl. Then it fell to the ground and became a salmon wearing a cravat around its neck and a pair of new top boots. Did Larry turn a hair at this? Not he!



"Come along there!" he called "Dance and I'll pipe!"

And he began to play as well as he knew how, while the Fairy Queen changed from one shape to another. At last, losing all patience, she turned into a gentle calf, milk-white as the cream of Cork, and her eyes were as mild as those of a loving girl. She came up friendly and gentle. She thought Larry would just pat her, and when he was not looking she might butt him and send him flying. But bold Larry, the moment she came near, dropped his pipes and leaped upon her back.

No sooner had he done so than the calf sprang from the hilltop, and with one bound leaped over the moonlit waters of the river Shannon, flowing just ten miles from the foot of the hill. A second later she kicked up her heels on the distant bank, flinging Larry on the turf. Larry sat up, scratched his head, looked up into her face, and cried:

"Arrah, but that was well done! Not a bad leap for a calf!"

The calf looked at him, then turned into the Fairy Queen.

"You're a bold fellow, Larry Hoolahan!" said she. "And will you be going back the way you came?"

"That I will, if you'll let me!" cried Larry. So the Fairy Queen changed into a calf again. Larry leaped upon her back. Another bound and they were on the hilltop once more.

"Much courage have you shown, Larry Hoolahan," said the Fairy Queen, again changing into her own shape. "And never more shall you be troubled by me or my fairies, while you keep the herds on this hill. The day now dawns, but if I can ever serve you, let me know." Then she vanished.

During Larry's lifetime she never visited the hill again. And Larry, piping, eating, drinking at the farmer's expense (and now and then watching the herd), never bothered the Fairy Queen with requests. At last he died, and was buried in the green valley of Tipperary. But whether the Little People came back to the hill after his death is more than I can say.

Irish Literature. For centuries before English became the dominant language in the British Isles, the people of Ireland spoke and wrote a language of their own. This language, Irish Gaelic, is a sister tongue of Scots Gaelic and Manx, and belongs to the Celtic branch of the Indo-European family (See Philology). Its nearest relatives are the 'Brittonic' languages including Welsh, Cornish, and Breton. With the emergence of a nationalist feeling in Ireland after the formation of the Irish Free State the Gaelic tongue was revived in common use. It is now taught in all schools and is in official use generally.

In this language the Celts developed an extensive literature. Their stories of gods and heroes—of Cuchulain, of Deirdre, of Finn and Ossian, and of the Shee (fairies)—were long handed down by word of mouth.

The piety and learning which blossomed under St. Patrick in the 5th century turned Ireland into the "Island of Saints and Scholars" (See Hebrides, Patrick, Saint). A flood of manuscripts recorded the old stories and the new religious writings—saints' lives, books of hours, and the like, but all but a handful of these manuscripts perished during the Danish invasions (A.D. 795–1000) or later. Fortunately, during the 11th and 12th centuries scribes copied or revised older manuscripts. Most of the later literature came from the bards (minstrels) rather than from the churchmen.

With the steady increase of English domination in Ireland, especially during the 18th century, most of the old great families died out or allied themselves with English culture. The best-known writers of that period—Jonathan Swift, Oliver Goldsmith, Richard Steele, Edmund Burke, Richard Brinsley Sheridan—belong properly to English literature (See English Literature). More truly Irish in subject and spirit are the novelist Maria Edgeworth and the caricaturist writers Samuel Lover and Charles James Lever, with their tales of peasant life and country squires.

Poetry still lived, in English forms and language. Gay and tuneful rhymes sing in the "Irish Melodies" of Thomas Moore and the poems of Francis Mahony ("Father Prout"). Deeper feeling marks the work of James Clarence Mangan, with his matchless translations and patriotic poems, and of Sir Samuel Ferguson.

Late in the 19th century the Gaelic League began to collect and publish the remnants of the native folk literature. Side by side with this revival of the Gaelic tongue grew a literary movement of distinctively Irish writing in English. Although some modern writers—such as Oscar Wilde, George Moore, Bernard Shaw and Lord Dunsany—belong to English literature, present-day Irish literature owes its glory to those who felt the inspiration of the Irish Literary Revival. Stories of Erin's former greatness and her modern struggle for a life of her own starred W. B. Yeats, Padraic Colum, Katharine Tynan, George W. Russell ("Æ"), and James Stephens. The greatest prestige came to the movement from the romantic tragedies and folk drama, written especially for Irish players by the Abbey Theatre group, Yeats, Colum, Lady Gregory, Sean O'Casey, St. John Ervine, Lennox Robinson, and Denis Johnston were members of this group. Foremost of all was John M. Synge, master of beautiful language in both comedy and tragedy.

MINING *and* SMELTING IRON *and* STEEL

Possibly the most important industries in the world—apart from agriculture—are those that deal with iron and steel in their various stages, for upon these metals our very life depends in this mechanical age

Iron AND STEEL Steel is a combination of iron usually with carbon, and is the form assumed by the metal when it does its mightiest

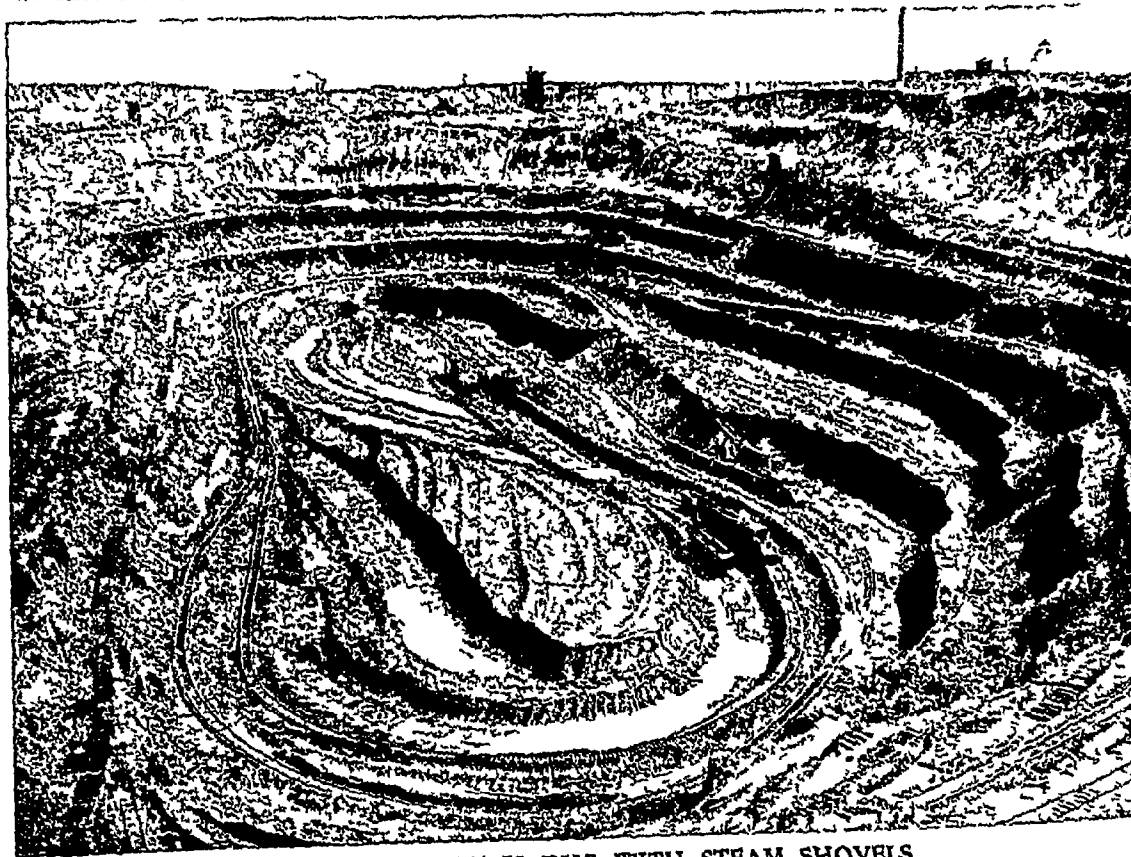


works Twentieth-century civilization is built on iron, almost always in the form of steel Our knives, scissors and razor blades are made of steel, so are the instruments used by surgeons and dentists Into the construction of every weapon of war steel largely enters Steel ships carry us across the ocean, we ride in carriages drawn over steel rails by steel and iron locomotives, our great office buildings have steel skeletons, and steel needles make our garments from cloth woven by steel machinery Steel and iron are at once our servants and our masters

Iron is one of the commonest of the 92 chemical elements of which the world is made, for only oxygen, silicon and aluminium occur in greater abundance Iron, in combination, has been calculated to make up about 5 per cent by weight of the earth's crust, though some have surmised that the unknown depths, if we could explore them, would show a larger proportion of iron It enters into most rocks and earths, the chlorophyll of plants and the blood corpuscles

And yet pure iron is scarcer than gold or diamonds It is rarely found in Nature except as a visitor from other worlds in the form of meteorites, it is unknown commercially, and is difficult to obtain even in the laboratory Probably you never saw the silver-white metal, pure iron

Why? Because iron has a plebeian temperament While the "noble metals" maintain an aristocratic exclusiveness which protects them against rust or tarnish, iron is passionately fond of society, especially that of oxygen, which cleaves to it closer than a brother In other words, iron has a strong tendency to rust if



WHERE IRON ORE IS DUG WITH STEAM SHOVELS

This picture shows you one reason why the United States is so great an iron-producing country This is one of the open mines of the Mesaba Range in Minnesota, where the ore is so close to the surface that after the top soil is stripped away the ore may be loaded directly into cars by steam shovels Thus an abundance of ore is obtained at comparatively low cost.

exposed to air and damp, for iron and oxygen make rust, or red oxide of iron. Hence, while iron does not refuse to make close friendships or combinations with many other elements, the oxides and other combinations into which oxygen enters are the most important iron containing substances in Nature. You may see iron and oxygen in the red dust and clay of the road, in the red brick of houses, in many red paints, and in the red cheeks of a healthy child.

Iron is adroit and versatile, changing its very nature according to circumstances and the company it keeps. It is like a dozen metals, in one, now almost diamond hard—and again almost as soft as copper, here brittle as glass—there malleable as silver, now welding readily—again, absolutely refusing to weld, melting rather easily—and at other times quite infusible, usually very magnetic—and again almost non magnetic, an excellent conductor of heat and electricity—and at times stubbornly resistant to both. For range of adaptability, iron stands alone.

Because uncombined iron is practically unknown in Nature, primitive Man used stone and bronze instead of iron for his weapons and tools.

Gold and copper were worked long before iron, which has to be released from the grip of other elements in order to take the metallic form. But long before history began to be written, some lucky savage, happening on a windy day to back an excessively hot fire with pieces of iron-ore, found a lump of strange metal in the coals, and was inspired to pound its red-hot mass into shape between two stones. Because of this he gained not only a very superior spear-head or sword, but much prestige among his fellows. The tales of divine smiths in many lands show the awed esteem in which the new craft was held.

During ancient times and the Middle Ages, the highest output of a furnace was three or four tons of iron a week. Four loads of timber were required to make each ton of pig-iron, and three additional loads to convert the pig into bar-iron, and it took at least two weeks more



Fox

SPARKS AND FLAMES IN A FOUNDRY

The making of iron and steel is a spectacular process and inside a foundry there is a continual shower of sparks and flames from the molten metal. This photograph shows iron being tapped from the blast furnace for conversion into steel. The shower of sparks in the top left-hand corner comes from the converter.

—not to mention the additional fuel—to convert the iron bars into steel.

Today our whole civilization is woven over a framework of iron and steel. The Age of Steel is the result of many innovations, discoveries and inventions, some the evolution of centuries, the greater number of the last 200 years.

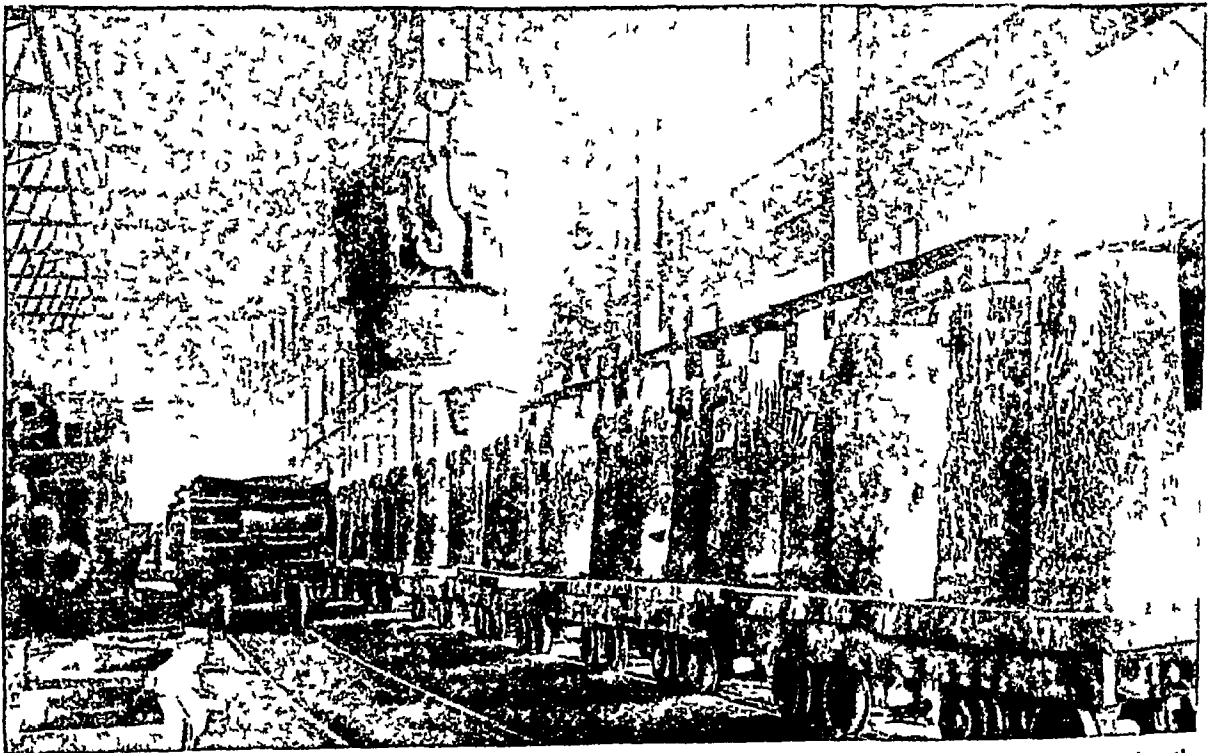
The bulk of our commercial iron is produced from four ores, the most important being oxides (hematite, magnetite and limonite) and one (siderite) a carbonate. Pyrites, the sulphide, is also in wide use as a source of iron and for other purposes (see below).

Hematite is the most widely distributed and important ore. Most of it looks like soft red earth. Iron carbonate, or siderite, is a hard crystalline grey or brown ore that can be profitably worked only when local fuel conditions are favourable. Iron pyrites (a compound of iron with sulphur), often called "fool's gold," is

IT GOES IN AS IRON AND COMES OUT AS STEEL



After hours of exposure to intense heat in the open hearth furnace, which is the brick structure in the background, iron becomes steel. When the transformation has reached the desired point, a clay plug in the drain-pipe is broken, and the molten steel runs out into the huge ladle, or cylindrical bucket, which you see to the right. The slag comes also, and flows off the top of the ladle into the conical receptacle at the left.



Huge hooks suspended from a travelling crane seize the ladle when it has been filled with molten steel at the open hearth furnace and swing it into line over a row of moulds. A box equipped with one or more nozzles is placed beneath the ladle, and the ladle's vent is tapped. Thereupon the steel runs out into the moulds, and cools into oblong ingots.

HOW STEEL IS PRODUCED FROM BOILING IRON



Our age is built on iron almost always in the form of steel. A Bessemer converter will make 20 tons of steel in a single blow of 15 or 20 minutes. A huge iron cauldron lined with fireclay and bricks bows its head to be fed with its white-hot ration of molten iron then rears up on its haunches growling and sending forth a great blast of dazzling flame as air is forced through from the bottom at high pressure. The result is steel the giant of modern industry, which is run off in a molten state. The converter to the left has finished its work, while its companion is just beginning.

Painted especially for this work by CHARLES DE LACY



Fox

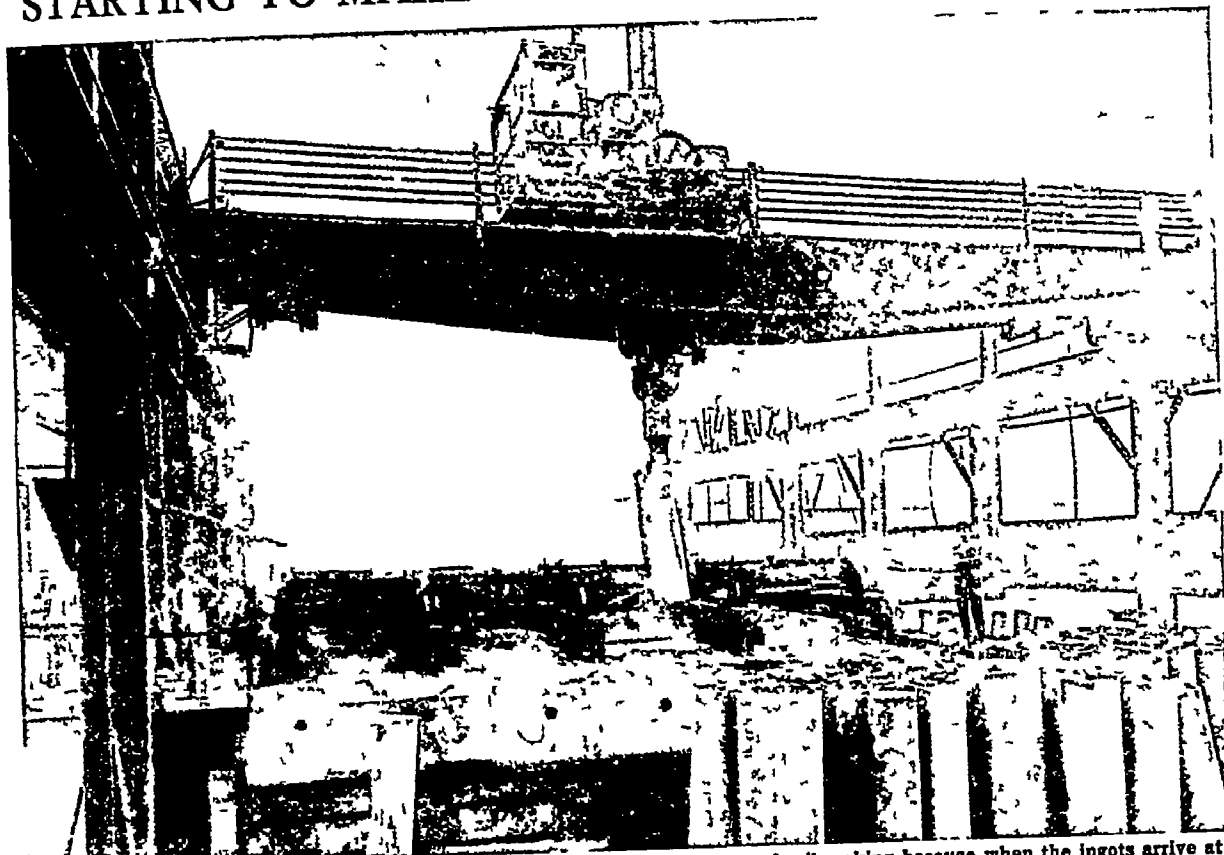


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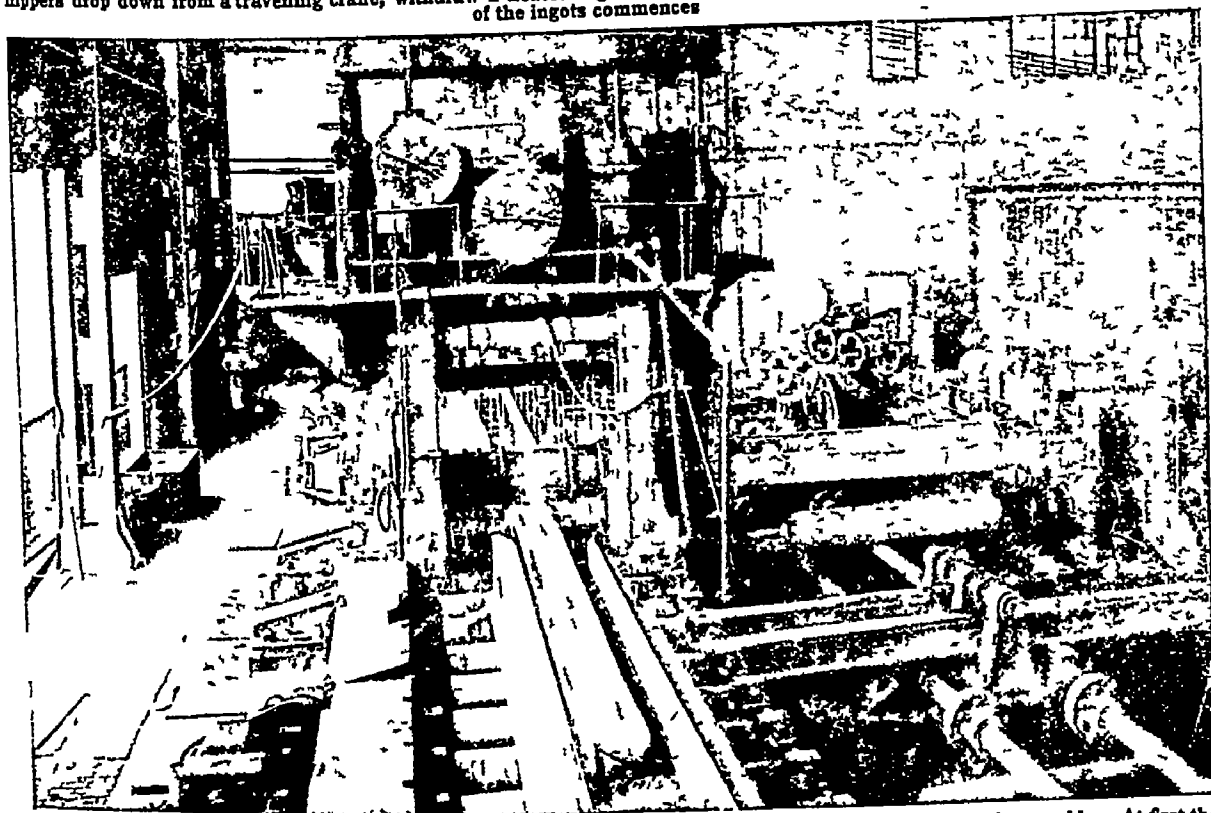
PIG IRON TO 'FIFTEEN INCH'

WHEN the bottom of the blast furnace is opened, a stream of white hot iron rushes down a channel made for it in the moist earth. In the upper picture you see men directing the flow into the moulds or "pigs." These pigs are broken up and converted into steel by one of many ingenious processes. The finished steel is then poured, while still white hot, into huge moulds where it is allowed to cool, forming great ingots. In the lower picture, you see one such ingot under a gigantic hydraulic press which is squeezing it into the right shape for the fifteen inch naval gun that it is intended for. Before being placed in the press the ingot was heated to the correct temperature in a furnace, so that the press might do its work more easily. The surface of the ingot has become covered with "scale" of oxide as a result of this treatment.

STARTING TO MAKE AN INGOT INTO STEEL RAILS

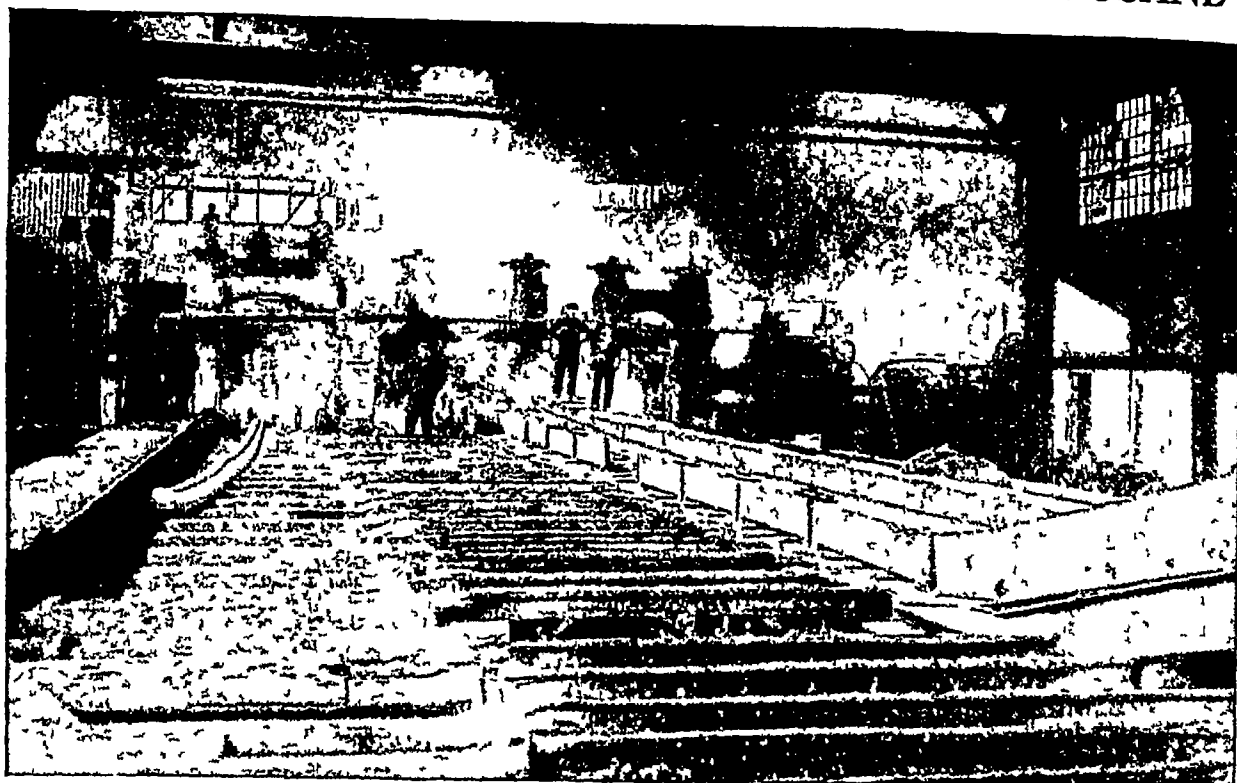


This picture shows the "soaking pit" process, which is necessary at the outset of rail-making because when the ingots arrive at the mill, they are not hot enough to be rolled. The first step therefore is to place them in upright covered furnaces known as "soaking pits," and there they are brought to the proper temperature. When this has been done, the lid of the furnace is removed, huge nippers drop down from a travelling crane, withdraw a heated ingot and take it to the "blooming" mill, where the actual rolling of the ingots commences.



Here the blooming mill is starting to make a rail. Streams of water keep the rollers cool, and the top roller is movable. At first the rollers are set almost the thickness of the ingot apart. Then as the ingot passes back and forth the distance is lessened until the ingot is reduced enough in thickness to go into the rail-rolling mill. In this condition it is called a "bloom" or "billet."

WHERE RAILS ARE TURNED OUT BY THE THOUSAND



This picture gives only a faint idea of how spectacular a process rail-making really is. When the hot "billet" comes from the blooming mill, it is shot through a powerful roll, is squeezed down in size, and emerges upon a bed of rollers such as the one you see here, in the form of a long writhing snake of glowing hot metal. From bed to bed and roll to roll this long strip shoots at high speed, until finally it is shaped and goes to the saws to be cut into rail lengths. The entire process is one of the most fascinating to watch in the whole steel mill.



The final manufacturing process in the story of the steel rail is shown here. After the rails leave the saws, they go to a cooling bed, where they remain until they have become cold. Then they are brought to these powerful presses, which straighten out the bends and kinks that they acquire as a result of being tossed about while red-hot. After the press operator is satisfied that they are straight, they are dragged off on to racks as you see, and they are then ready for inspection and shipment to the railways.

IRON & STEEL

used in enormous quantities in making sulphuric acid. Other iron bearing minerals occur, but are unimportant as sources of iron.

The ores are generally mixed with impurities, such as silica, alumina and lime. A rich ore contains more than 50 per cent of iron, an average ore, from 35 to 50 per cent, a poor one, working under favourable conditions, from 25 to 35 per cent. Ores containing less than 25 per cent of iron are considered useless.

Iron ores are very widely distributed over the face of the earth. The United States is at present the leading iron-ore producer and consumer, producing about one third of the world's total output of pig-iron.

Outside of the United States, the most important ore producing regions are Russia, Germany, the United Kingdom, and France. It was largely the acquisition of part of the Lorraine iron mines at the close of the Franco-German War (1871) that enabled Germany to attain its manufacturing and military greatness. The loss of these ores through the return of Alsace-Lorraine to France in 1918 was a very serious loss to German industry. Recently the output of iron ore from Russia has been annually increasing and is now second only to that of the United States. British ironworks now import most of their ores from the Continent, particularly Spain and Sweden, and from more distant countries as well, although Cumberland, Cleveland Hills in Yorks, and Antrun still supply a part of the demand.

The Three Objects of Smelting

In smelting ore to produce iron, it is necessary to accomplish three things—get rid of the impurities with which the iron oxides are mixed, release the iron from the oxygen with which it is combined, stiffen the soft iron by mixing it with just enough carbon. The whole is accomplished at once in the heat of the blast furnace—the first by the lime, the second and third by the carbon of the fuel loaded into the furnace with the ore. (See Blast Furnace)

In old-fashioned blast furnaces the molten iron was drawn off directly into sand moulds or troughs which bore a fancied resemblance to a family of little pigs lying alongside their mother and feeding. Hence the term "pig-iron" was applied to the product of the blast furnace.

In modern practice, the liquid iron is frequently rushed to the steel mill to be made into steel before it cools, or to the "pig" casting machine which today takes the place of the old sand moulds. Whether it ever becomes a "pig" or not, the product of the blast furnace is called "pig iron," the intermediate or semi-raw material from which practically all our iron—cast iron, wrought iron and steel—is made.

Before the invention of the blast furnace, iron was smelted in small forges which used charcoal

as fuel. The iron was seldom completely melted so that the metal could be poured and cast, but it was kept red-hot and hammered into shape as wrought iron. The growing scarcity of wood for making charcoal for a time checked the growth of the iron industry, but about 1735 the step was taken which made possible our modern blast furnaces, producing 400 to 1,000 tons of iron against the 10 to 100 of the old forges, this was the substitution as fuel of coke manufactured from bituminous coal in place of charcoal.

Differences between Iron and Steel

Cast iron, wrought iron, and steel are all mixtures or combinations, in varying proportions, of iron and carbon. The differences among them might once have been simply stated in this way:

Cast iron has a high percentage of carbon—usually about 2 to 3.5 per cent. It melts at a lower temperature and flows readily into moulds, becoming brittle when cold. It is cast into stoves, radiators, gas pipes, water and sewage mains, and machine parts which do not have to withstand severe shocks and strains.

Wrought iron has had most of the carbon burned out, leaving not more than 0.3 per cent. It does not melt as readily as cast iron, and when heated it can be hammered into shape. It is tough and strong, though not so strong as steel, it welds easily and bends before it breaks. It has many industrial uses, as for chains, anchors, rivets and bars, but its field is constantly being restricted by the increasing cheapness of steel.

Steel, until our own time, was iron containing less carbon than cast iron (not more than 2 per cent) and more carbon than wrought iron. Its distinguishing property, however, is that it can easily be made hard and brittle, or tough and malleable at will by careful "tempering", that is, by heating to a cherry-red, then cooling—in water, oil, air or some special bath. Thus steel may be made for very different uses.

New Kinds of Steel for all Purposes

Now, all these definitions are still true of types of iron and steel, and may well be remembered as such, but the addition of new members to the cast-iron and steel groups has criss crossed the family characteristics confusingly, and made necessary enlargements of the old definitions. A malleable cast iron is now produced by annealing. It resists battering and shock, is nearly as strong as mild steel and, because of its cheapness, is much used in railway-carriage castings, reapers, binders, pipe fittings, etc. The Age of Steel was created by new steels which meet the old definition with difficulty or not at all, that is, by so-called mild and medium steels which contain so little carbon that they can never be made hard. In fact, the name of "steel" is now generally applied to any malleable iron obtained from the liquid state. The

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ancient steel is thus placed in a subordinate class as "high carbon steel"

We have spoken as yet only of iron and carbon, but many other elements—especially silicon, manganese, sulphur, nickel, chromium, tungsten, and phosphorus—enter into our manufactured iron and steel (The wonderful alloy steels are described under Alloys) In steel and some irons a fraction of 1 per cent of a single ingredient may make or mar the product The chemist who watches these points is therefore an important man in iron and steel making The

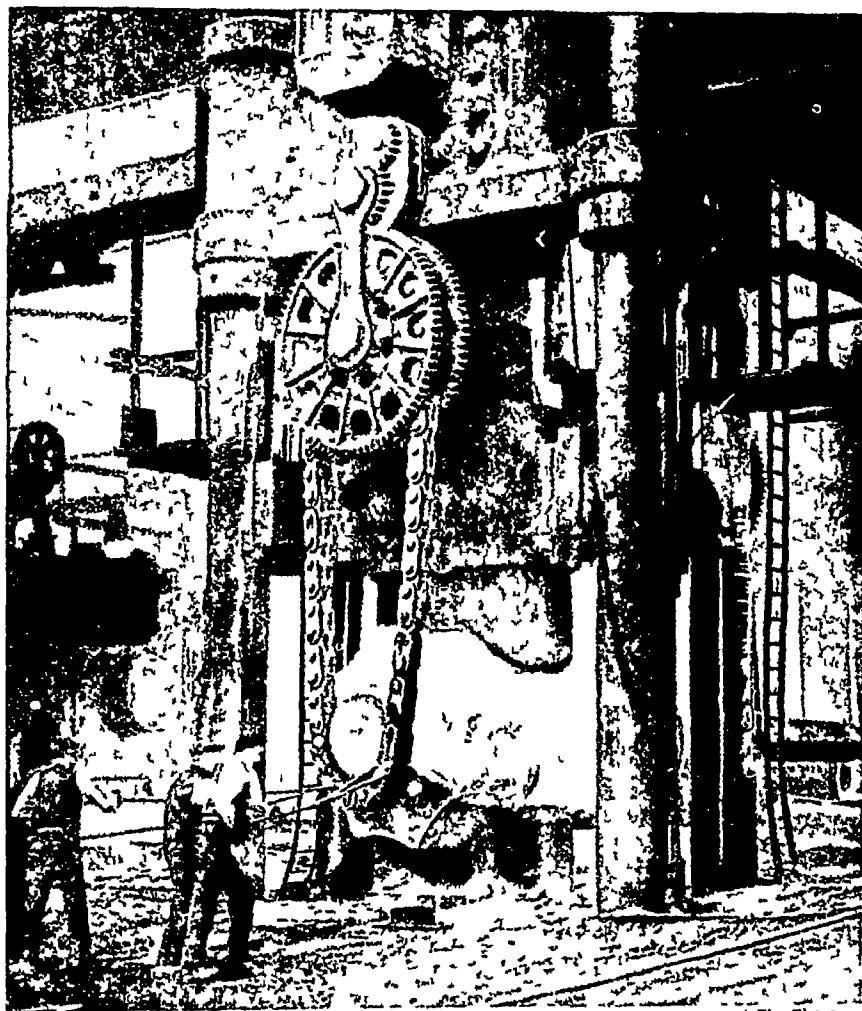
that the pig-iron is melted and the excess carbon burned out in the hearth of a "reverberatory furnace," and without coming into contact with the fuel, hence without absorbing sulphur The molten iron is stirred by the "puddler" until it forms into spongy balls, these are then worked and reworked to press out the dripping slag, and then, still hot, the puddle bars are run through iron rollers (the "rolling mill" also was Cort's invention), the process being repeated as often as necessary to give the grade of iron desired It has never been possible to replace highly skilled labour by machinery in the puddling process

Steel was once made by packing bars of wrought iron on to powdered charcoal, sealing them in a clay chest, keeping the whole red-hot in a furnace for a week or ten days, then letting it cool for another week or so This was the "cementation process", its product was "spring steel" or "shear steel" Then in 1740 a Sheffield watchmaker produced an improved steel by melting cemented steel in a clay crucible Ever since, the incomparable Sheffield steel for fine cutlery has been made in that way

About 1847 an American named William Kelly noticed that a draught of air striking the molten iron in his Kentucky iron works made the metal seethe and boil Why did cold air heat instead of chill the metal? He remembered that the molten iron still contained carbon and other combustible material, and guessed that the oxygen of the air captured and carried away the excess carbon as a

gas This was the beginning of modern steel-making A few years later an Englishman, Sir Henry Bessemer, observed the same thing, and independently worked out the "fuel-less" process which he patented in Great Britain in 1855

The original Bessemer process failed to remove any phosphorus that might be present in the iron This meant that no ones containing more than 0.1 per cent of phosphorus could be used as the basis of the pig-iron worked up by this



FORGING SHEFFIELD STEEL

Sheffield is still the great centre of the British steel industry, and produces every sort of steel article from the smallest to the largest This photograph shows a white-hot steel billet being forged under a 10,000-ton press in Messrs Vickers' Sheffield works When the Government's rearmament programme of 1937 was embarked upon, many steel works entered upon a new period of prosperity

addition of nickel, chromium, tungsten and other metals in small proportions has resulted in high-tension steels of the greatest value to armaments firms and machine-tool makers

Formerly wrought iron could not be made by using coal or coke as fuel, for they contain sulphur, and sulphur made the iron brittle Yet today we are able to make wrought iron by a coke fire, thanks to the "puddling process" invented by Henry Cort in 1784 The secret is

MAGIC FURNACE THAT MAKES OUR NEW STEELS



Miracles in metal are performed by the modern electric furnace shown above. It is heated to a temperature of 3 000° F. by current passing through huge electrodes in the furnace roof. This furnace is especially valuable in producing fine steel alloys.

process into steel, for steel containing more than 0.1 per cent of phosphorus is brittle. Thus the Lorraine ores, which contain from 0.3 to 0.8 per cent of phosphorus, were useless for Bessemer steel. But in the very year (1871) which saw the annexation of Alsace-Lorraine by Germany, a new process was invented which makes phosphorus iron-ores available for Bessemer steel—indeed, the phosphorus is “turned from a curse to a blessing.” It was this process, although it was discovered in England, that made Germany the foremost steel-making nation on the continent of Europe.

‘Gas’ Furnace of Siemens and Martin

The next great advance in steel-making was what is called the Siemens-Martin process, after its inventors. In this process the molten iron is placed in a basin or open hearth played over by intense heat but shielded from the direct flame, somewhat as in the puddling furnace. The greater heat required is obtained by an ingenious device called the “regenerative furnace.” For about half an hour gas and air enter through the “ports” or valves on one side, and burn in the furnace, while the hot gas produced by the combustion escapes through the “ports” on the opposite side, then the valves are reversed and the gas and air admitted through the heated chambers on that side. This periodic reversal produces a continually rising heat until the charge is ready to tap, the name given to the process of running the ready, molten metal into giant “ladles,” from which it is run into moulds.

Advantages of the Bessemer Process

With the open-hearth process steel can be made from iron of any composition, and it has the further advantage of permitting physical and chemical tests of the product at any time during the “heat.” On the other hand, while a Bessemer converter will make 20 tons of steel in a single “blow” of 15 or 20 minutes, an open-hearth furnace requires about 13 hours to make 125 tons of steel. The Bessemer has long been the cheaper, but with the growing scarcity of ores suitable for “bessemerizing” the open hearth has become more widely used. There are also electrical processes of steel-making which have been in commercial use since the beginning of the 20th century. But the bulk of the world’s steel is made by the open-hearth and the Bessemer processes. World production averages 120,000,000 tons annually.

Henry Cort’s rolling mill has become even more important in connexion with the manufacture of cheap steels than with the wrought iron for which it was invented, it has, indeed, produced a specialized and subdivided industry. Some rolling mills make semi-finished products—“blooms,” slabs, billets, and bars—to be worked up elsewhere, others make finished

steel products—rods, bands, railway rails, plates, wheels, axles, etc.

One important piece of machinery, the steam hammer, must be noticed. The early power hammers, invented to do the work formerly done by hand forging, required great labour and constant attention. The novel advantages of James Nasmyth’s steam-hammer, invented in 1839, are automatic working and perfect control. The hammer-head, or trip, is raised by steam, when the steam is cut off, the trip falls, and so exquisitely is the device regulated that a mammoth hammer which could pulverize a granite boulder with a single blow can also break an eggshell without chipping the egg-cup which contains it.

“Stainless steel” and “rustless iron,” forms of alloy steel, are taking important places in commerce. Stainless steel is used extensively for cutlery. It resists corrosion and appears valuable in resisting heat. Bridges and general construction may some day be built from alloys of this type. Some motor-car manufacturers use rustless iron for hub caps, lamp frames, and radiators. It takes a high polish and does not stain.

Iron Mask, MAN IN THE There are many mysteries in history that puzzle and intrigue us, although we are never likely to solve them, and one of them is “The Man in the Iron Mask.” The person so called was a political prisoner in the Bastille in the days of Louis XIV. His face was always covered with a mask, not of iron but of black velvet. He had been brought to the Bastille in 1698 from another prison, and he died there in 1703.

One theory, perhaps the most likely, is that the mysterious prisoner was Count Mattioli, the chief minister of the Duke of Mantua. Mattioli had promised, for a large bribe, to betray an important frontier fortress to Louis XIV, but had betrayed his promise. Louis thereupon had him kidnapped, and imprisoned for life in the Parisian fortress.

Was He Charles II’s Son?

Another theory has it that the prisoner was the chief of a great conspiracy against the king, and others say that he was a son of Charles II or of Oliver Cromwell. Voltaire (who had himself been an inmate of the Bastille on two occasions) suggested that the prisoner was a brother of Louis XIV. When the Bastille fell in 1789, the room that had been occupied by the mysterious prisoner was ransacked, but nothing that threw any light on his identity was ever discovered.

We shall probably never know for certain the name of the person whose face was hid behind that black mask, but of this there can be no doubt, that he supplied Dumas with the name and inspiration of one of his most thrilling historical romances.

IRRIGATION & RECLAMATION

MAKING DESERT & SWAMP FERTILE

All over the face of the world deserts are being made to blossom like the rose by irrigation, and fens are being reclaimed from the sea to make productive fields of rich soil

Irrigation, AND LAND RECLAMATION

When we look at the map of the world we cannot help noticing that there are some great areas which seem to have far too much water, leaving huge bays and lakes near the sea, while in other waste areas Nature has gone to the other extreme, leaving large tracts of land without sufficient rain fall to grow vegetation of value. From earliest times men have devoted their labours ceaselessly to reclaiming such waste areas



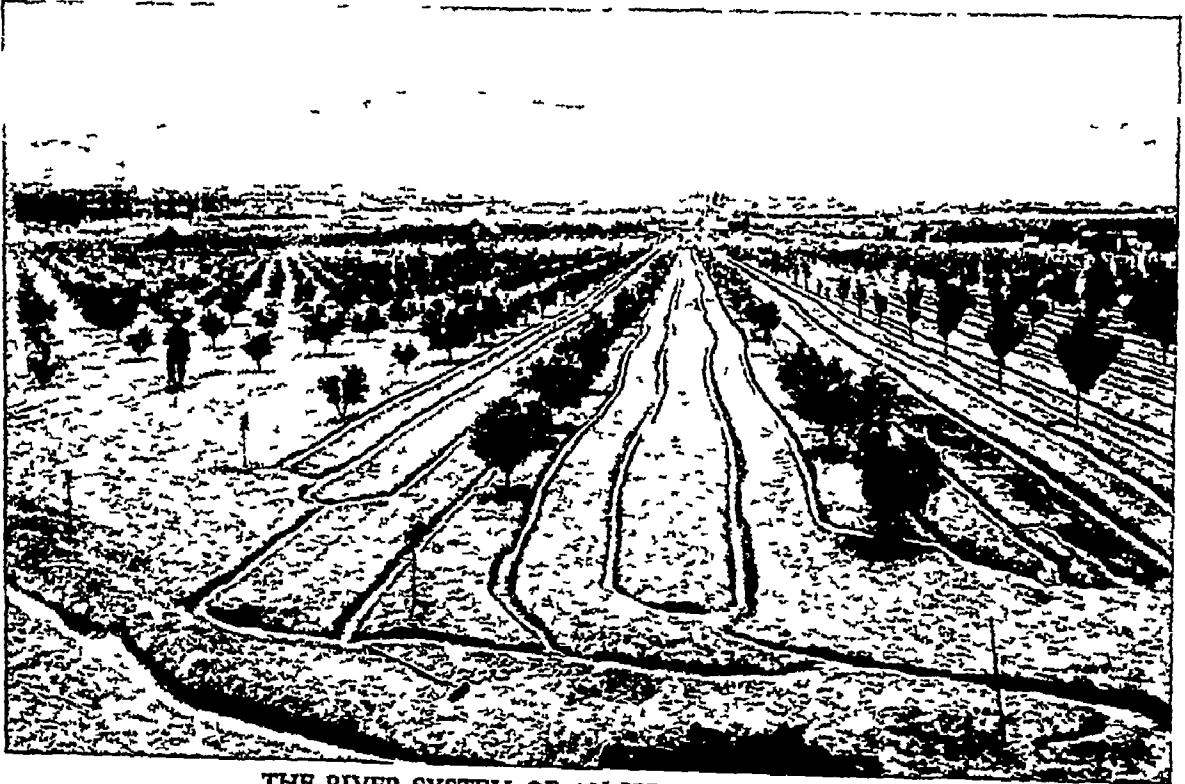
Irrigation in Australia

of land or shallow sea for productive purposes—and, once won, to keep them fertile. Experience and knowledge taught them to bring water to such regions. Irrigation of desert areas was undertaken many thousand years ago—in Egypt, Assyria, Babylonia, India, and China. The Egyptians still use buckets at the end of well-

sweeps to raise water from the Nile to water adjacent lands during the dry season. In India large leather sacks or pouches of water, holding as much as 30 gallons, are drawn from wells by bullocks and poured into ditches leading to the ground under cultivation. Governments also have undertaken irrigation on a large scale. There are now some five millions of acres irrigated and fully-productive in Egypt through the instrumentality of British capital and engineering genius. The Assuan Dam, $1\frac{1}{2}$ miles long, holds up an enormous volume of the Nile flood waters, for irrigation use during the hot dry season. The Lloyd Barrage at Sukkur over the Indus, irrigating nearly eight million acres and bringing fertility to the sterile desert of Sind (India), is also a British achievement.

In India, state irrigation works water about 50,000,000 acres. Some large irrigation dams are found in the U.S.A., including the huge Boulder Dam on the river Colorado. (For a list of the world's biggest dams, consult the Fact-Index under the heading Dams.)

These great undertakings, however, seem but a drop in the bucket when one considers the



THE RIVER SYSTEM OF AN IRRIGATED ORCHARD

In distributing water by the method used in this American orchard, advantage is taken of the general slope of the country. If a stream from those distant mountains for instance, enters the valley, a canal is cut near its point of entrance, and water is diverted along the upper slopes. Ditches are taken out to the orchards below, and these ditches in turn feed the smaller ditches seen here. The small picture shows a water wheel used to measure the consumption of water on an Australian irrigation system.

IRRIGATION & RECLAMATION

area of the waste lands of the Sahara. The fertility of the oases in the midst of the desert shows what the desert land can do if supplied with water, and challenges Man to make this large area blossom as the rose and bring forth fruit at his bidding. Various projects have been discussed for the reclamation of parts of this area, but the desert still waits to test the strength and courage of the first agency undertaking its reclamation on a large scale.

On the American continent, irrigation was practised by the Pueblo Indians of New Mexico and Arizona before the coming of the white man. The Spaniards taught the inhabitants of Mexico and the south-western part of the United States to build dams and reservoirs to store water for irrigation. Much has been done in the irrigation of small areas by individual effort, and by associations of farmers uniting to furnish pumps and construct ditches to conduct water to their fields or orchards. Some of the ditches on the old irrigation projects of the earliest settlers are still in use.

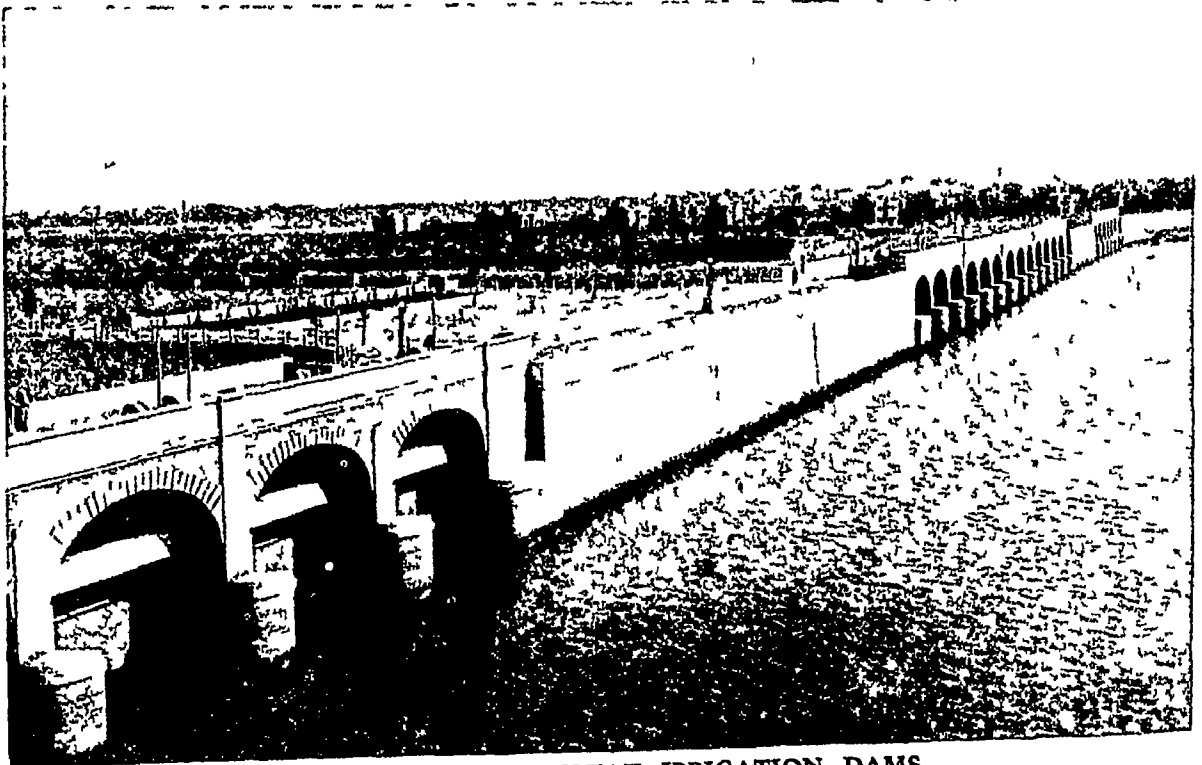
In irrigating, the water may be applied to the land by flooding—that is, covering the entire surface of the field with water—or it may be distributed over the field and around orchard trees in furrows made for the purpose. Another method is called sub-irrigation, in this system, metal pipes or tile conduits carry the water underground to the places where it is needed.

These pipes may even be perforated to allow the water to flow out along their entire length.

Fascinating as this work of irrigation may be, that of land reclamation is perhaps even more interesting and, in many countries, much more important. This is perhaps because irrigation is usually practised in countries where there is a well-spread population living on the land, which is being made more fertile. Reclamation, on the other hand, is often carried out in lands whose whole available space is already occupied, and in which therefore more space must be found without having to go far afield. This is done, for the most part, by ditching and draining inland areas that are at present just swamps, by enclosing and gradually draining marine swamps along the edge of shallow coasts, and by enclosing and pumping out large shallow lakes near the sea, or inlets of the sea itself.

Holland's Disappearing Sea

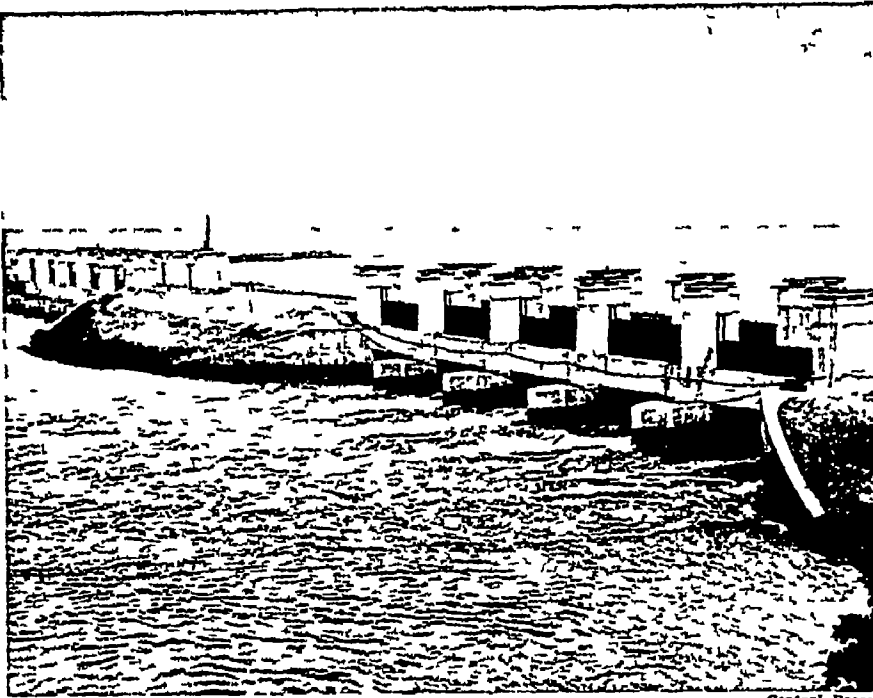
The classic instance of land reclamation is, of course, Holland's Zuyder Zee. This vast area of shallow sea is being steadily reclaimed by those methods in which the Dutch, through long practice, brought about by sheer necessity, have become expert, but so great is the area and so slowly must the work proceed that the whole task will have occupied more than thirty years by the time it is finished. For hundreds of years, however, the thrifty Dutch have been steadily reclaiming and draining their low lying



ONE OF INDIA'S GREAT IRRIGATION DAMS

Much of the parched lands of Sind has been made fertile by a great irrigation scheme fed by the waters of the Indus. This photograph shows part of the scheme at Sukkur, where a great dam holds back the waters of the river. It is called the Lloyd Barrage after Lord Lloyd, who was governor of Bombay, 1918-1923, when Sind was still part of the Bombay Presidency. This picture shows some of the locks that regulate the flow of the water into the irrigating canals.

Courtesy of Indian Railways Bureau



Central Press

THE GREAT DAM ACROSS THE ZUYDER ZEE

One of the greatest engineering feats of modern times is the reclamation of the greater part of the Zuyder Zee, Holland's great inland sea. The work was begun in 1920 with the construction of the great dam, 18 miles long, which cuts off the Zuyder Zee from the North Sea. The dam, which now carries a motor road, was completed in 1935. The photograph shows a portion of it, and some of the sluice gates by which the waters of the IJssel flow out into the sea.

lands, and gradually they have turned the marshes of their flat and level country into fertile farm districts by an extensive system of dikes, canals, and windmills. These reclaimed districts are called "polders." The picturesque windmills, so characteristic of Dutch landscapes, number about 3,000 and are used to pump water out of the low land in the polders into canals constructed to carry the water to the sea.

Even in Holland, however, the success has not been so complete as it might seem, and this was shown in 1937 in the case of some of the newest reclaimed land. The damming of the Zuyder Zee, for example, created the large inland Lake IJssel, in which have bred a species of green gnat, flourishing in its new home. And these gnats have become so numerous that in 1937 all work was more or less at a standstill at times. Everything was coated with gnats; motor cars were put out of action, houses looked as though they were painted green, the air hummed and throbbed with the sound of the gnats' wings. And so, for all the wonder of the reclamation, there is still much to be done before all goes well on the new land.

In England, the chief object of reclamation is the Wash, that great shallow inlet of the North Sea. But so far all efforts, even schemes on a really big scale in that area have failed, and the sea still holds its own against Man. Even in London, however, there is plenty of reclaimed land, for parts of Battersea, and

for example, such districts as Dagenham near the river, were not so long ago useless marshes, where now stand great factories and rows of houses. In East Anglia, too, the whole face of the land has been changed within the last century, with the draining of the fens and their steady conversion from impassable swamps to some of the richest agricultural land in Britain. So the work goes on, with the reclamation of land from the sea, and exploitation of the dry desert by irrigation driving back water in one place, and using it for development in another.

Irving, Sir Henry (1888-1905) The first actor to be knighted—an honour which both recognized his leadership of the English stage and



IRVING IN 'THE BELLS'

One of Henry Irving's most famous parts was that of Mathias in 'The Bells.' This was the rôle of a murderer, in whose ears rang ever after his crime the bells of his victim's sleigh until he was tortured by his conscience into confessing to the murder.

IRVING

put an end to the old idea that actors and actresses had no social position the man who gained this honour for himself and his profession was the son of a small shopkeeper at Keinton Mandeville in Somersetshire, and he won fame entirely by his own merits and exertions

In his youth he worked as a clerk, but his heart was set on the stage, and in his spare time he studied elocution, dancing, and fencing, and read plays in which he hoped one day to act

At the age of eighteen he obtained his first engagement as an actor, and for the next few years played with many provincial companies, sometimes earning as little as 25s a week, out of which he had to contribute to the support of his parents He obtained his first London engagement in 1806, but he did not achieve fame until 1871, when, as Mathias in Poe's "The Bells," he gave a memorable performance That play remained in his repertory until his death

Irving is best remembered by his long term as actor-manager of the Lyceum Theatre, London, where, with Ellen Terry as his "leading lady," he had a long series of successes, staging Shakespearean plays and poetical and romantic dramas His greatest financial success was an adaptation of "Faust," he himself playing Mephistopheles and Ellen Terry Marguerite, while his greatest artistic triumph was achieved in

Tennyson's "Becket" produced in 1893 In 1905 he went on a provincial tour, and, after playing in "Becket" at Bradford, collapsed on leaving the stage and died after being taken to his hotel He was buried in Westminster Abbey on October 20, 1905 A statue of Irving stands at the back of the National Portrait Gallery near Trafalgar Square

Irving, WASHINGTON (1783-1859) Essayist, historian, and writer of stories, Irving was the first of the great American writers, and is best known as the creator of Rip Van Winkle

Irving was born in New York City, and it was from there that he drew much of the material for his stories and sketches, nearly all of which deal with the romantic past Never a very strong child, he spent more time with dog and gun rambling about the country regions which he later described, than he did in school Some times, too, he wandered into the Dutch part of the city and listened to the quaint stories told by the Dutch descendants

While at home he spent a great deal of time reading in his father's large library He was always cheerful, kindly, and good natured, though a great part of his life was a struggle against ill-health, grief, and uncongenial work for the day had not yet come when an American author could support himself by his writing



SCENE FROM A WASHINGTON IRVING STORY

One of the innumerable funny stories in "Knickerbocker's History of New York" tells how Wilhelmus Kieft, one of the Dutch governors of New York, thinking people talked politics too much and that smoking was the cause of it, issued an edict prohibiting the practice Whereupon the smokers, with those long pipes and plenty of tobacco, gathered before the Governor's house and "smoked him out" The rebels won The painting is by George H Boughton.

Irving began the study of law, but his already delicate health was still further impaired by grief over the death of his fiancée. His family, therefore, sent him abroad, where he travelled in England, Holland, France, and Italy. When he returned, he wrote a humorous miscellany entitled "Salmagundi," and a little later appeared his burlesque "History of New York from the Beginning of the World to the End of the Dutch Dynasty," published under the pseudonym of "Diedrich Knickerbocker."

The young author soon went abroad again on business for his brothers, and this time he met many famous writers in England and gained new inspiration. He now set about writing in earnest, and the first result of these labours was "The Sketch Book," which, through the influence of Sir Walter Scott, met with a good reception in England. Irving remained abroad for many years travelling, writing, and in the diplomatic service of his country. While he was minister to Spain (1842) he became interested in Spanish history, and his studies there furnished his lively imagination with plenty of material for "The Alhambra" and his life of Columbus.

"The Sketch Book" is the best and most widely known of Irving's works. It contains the stories and sketches of "Rip Van Winkle" and "The Legend of Sleepy Hollow" in which Irving used the legends which he had learned from the descendants of the old Dutch settlers, the mysterious tale of the return of Hendrick Hudson and his men, and the ghost story concerning the headless horseman.

Isabella of Castile (1451-1504). It was the happy fortune of Queen Isabella I of Castile and Leon to give to Europe a new nation and to the world a new continent. The first event came through her marriage in 1469, while Queen of Castile and Leon, to King Ferdinand of the neighbouring and rival Spanish kingdom of Aragon, thus uniting the two chief kingdoms in the Spanish peninsula. Her second claim to fame came through her support of Columbus.

Isabella was a woman of remarkable energy and talent, beautiful and possessed of winning grace, although at times proud and ambitious. She was always present at state meetings, and her name was placed with that of Ferdinand at the end of all official documents. Her part in the founding of a national Spanish inquisition under royal control, with its persecution of the Moors and Jews, shows the intolerance in religious matters which she shared with her husband and the majority of her contemporaries.

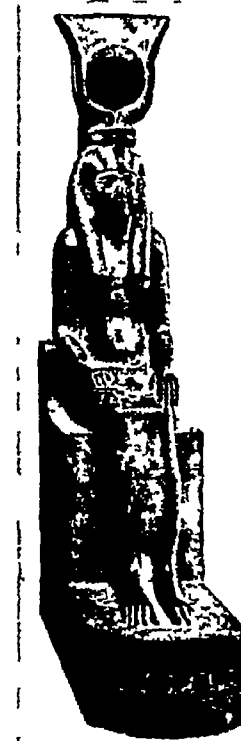
History relates that Columbus, when he applied at the court of Spain for help in his projected voyage of discovery, failed to receive the sanction or aid of Ferdinand and the learned council. Columbus, discouraged, was about to leave for France, when he succeeded in interesting

Isabella in his plan. The king remained indifferent and pleaded want of funds. The queen, so the story runs, in her earnestness exclaimed "I pledge my jewels to raise the money." Columbus succeeded at last, and to Isabella belongs the honour, for even though the story of the jewels has no basis but legend, it is true that Isabella's interest and support made possible the voyage of Columbus.

Isinglass. The dried swimming bladders of several varieties of fish, this contains from 86 to 93 per cent gelatine and sometimes more. The Russian variety, which is supposed to be the best, is made principally from the sturgeon.

Isinglass is used for the same purposes as gelatine, in soups and jellies, for clarifying fermented liquors, and in the manufacture of glue, court-plaster, cement, etc. (See article on Gelatine).

Isis. (Pron *i'-sis*) Isis is the "queen of the gods" in Egyptian mythology, and the sister and wife of Osiris. She represented the moon, as Osiris did the sun, and was believed to have taught agriculture to the Egyptians. The old legends tell of her lament for her slain husband, and it was said that her tears caused the overflow of the Nile. The cow was sacred to her, and she is often represented with the horns of this animal. The worship of Isis was introduced into Greece about the 3rd century B.C., and later became very popular in Rome. The cult extended into Asia Minor, where Isis was regarded



GODDESS ISIS

The ancient Egyptian goddess of the moon carries a moon-like disk between the horns on her head, she wears these because the cow was sacred to her.
British Museum

as the bestower of dreams and also as the inflicter of diseases and the restorer of health.

Istanbul, (Constantinople) On foot, holding a lance, the Emperor Constantine, in the year A.D. 324, led the procession which traced out the boundaries of his new capital, Constantinople. His assistants observed with astonishment the growing circumference, which exceeded the size of a great city. "I shall still advance," replied Constantine, "till He, the invisible Guide who marches before me, thinks proper to stop."

In 1923, when Turkey had become a republic, Constantinople ceased to be the capital, and

ISTANBUL



ISTANBUL SEEN FROM ACROSS THE GOLDEN HORN

L.N.A.

This view of Istanbul from Pera shows the inner commercial harbour on the Golden Horn, dominated by the 200-foot-high Serasker Tower. To the right of this may be seen the solid-looking block of the Ministry of War barracks, and on the extreme right is the superb mosque of Solyman the Great, with its four beautiful minarets. The absence of factory chimneys is very noticeable, but this is because Istanbul has always been a bartering rather than a manufacturing centre.

the seat of government was transferred to Ankara. In July, 1932, the name of Constantinople was officially changed to Istanbul, and it was decreed that the use of the old name would be punishable by law and that letters addressed to Constantinople would be returned.

In the days of her greatest prosperity every wind wafted the riches of the most distant countries of the world into her secure and capacious harbour, the Golden Horn. Situated on her seven hills on the shores of the narrow Bosphorus, between the Black Sea and the Sea of Marmara, with the narrow Hellespont (Dardanelles) leading thence to the Aegean, her port could easily be closed to the naval fleet of an enemy in time of war, and opened in peace to the fleets of commerce. When the Turks broke through its walls and obtained possession of the city, in 1453, they were able to cut off the trade of Europe with the East, and so gave occasion for Columbus, Vasco da Gama, and others to search for new routes to the West.

Before Constantine's day the site of Istanbul was occupied by the Greek city of Byzantium, founded in 667 B.C. by Greek colonists from Megara. Today the city presents a magnificent appearance from the sea, especially in that section where the rose and white of the mosque

of St. Sophia and the golden gleam of many minarets are visible. St. Sophia is now a museum of Byzantine art, and the mosaics on the walls are being restored. Another show place is the old Seraglio which was for 400 years the private home of the Sultans of Turkey and has now been restored to its original condition.

The city is really made up of three smaller cities. To the south lies Stamboul, the Mahomedan quarter. Galata on the east is the business section, and Pera, to the north, the foreign quarter. Stamboul is separated from Galata by the Golden Horn, an inlet that is one of the most distinctive features of Istanbul, for it provides a fine natural harbour capable of floating the largest ships. Across the Bosphorus is Scutari, or Uskudar, which is practically a suburb of Istanbul. There are few large factories, but rugs, carpets, and embroideries are made by hand in the little shops and in the homes. The chief business, however, is commerce, for through the city is still shipped much of the trade passing between East and West, although the building of railways has somewhat diminished its importance as a shipping centre. It also suffered a good deal when the capital of Turkey was moved to the Asiatic mainland. Population, about 740,000.

ITALY

A JOURNEY *through* SUNNY ITALY

Full of beautiful scenery and picturesque cities, Italy is a favourite touring-ground for those who can afford to travel. But we can all journey there in imagination, using this article as our guide-book

Italy. The peninsula of Italy dips down into the blue waters of the Mediterranean like a tall high heeled boot, walking off towards Spain and kicking along the islands of Sardinia and Sicily in its path. The very top of the boot is rimmed with the snowy peaks of the Alps, and handsomely bejewelled with bright lakes—Maggiore, Lugano, Como, Iseo, and Garda. Here also lies the flat fertile valley of the Po, containing the richest of farm land.

The leg of our boot is ridged by the Apennine Mountains, and scattered along its length are the plains of Tuscany, the Campagna di Roma, Apulia, and the fertile Campania which accounts for much of the prosperity of Naples

Extent—Greatest length of peninsula, about 700 miles, average breadth, 200 miles. Area (including Sicily, Sardinia and other islands), 119,713 square miles. Population, about 44,470,000.

Colonies and Dependencies—Ethiopia (Abyssinia), Eritrea and Italian Somaliland—forming Italian East Africa, and Libya in North Africa, Aegean Islands. Area, estimated about 940,000 square miles. Population, about 12,400,000.

Physical Features—Mountains Alps and Apennines. Volcanoes Mt. Vesuvius (near Naples), and Mt. Etna (in Sicily). Rivers Po, Adige, Arno, Volturno, Tiber. Lakes Maggiore, Lugano, Como, Iseo, Garda.

Cities—Rome (capital, 1,155,000), Milan (1,115,000), Naples (865,000), Genoa (634,000), Turin (629,000), Palermo (411,000), Florence (316,000), Venice (264,000), Bologna (269,000), Trieste (248,000), Catania (244,000), Bari (196,000), Messina (192,000), Verona (153,000), Padua (138,000), Leghorn (124,000).

Products—Agricultural grapes, olives, lemons, oranges, and other fruits wheat, maize, oats, barley, and rye, beans, potatoes, and other vegetables, forage crops, sugar beets, dairy products. Manufactures textiles (cotton, silk, rayon, and wool), wines, olive oil, sugar, clothing (including hats, gloves, shoes), leather, paper, steel, machinery, and motor-cars, chemical products, glass and pottery. Mining marble, sulphur, coke, zinc, lead and iron. Fishing tunny, sardines and anchovies.

On the Adriatic side lies the misplaced "spur" of Mt. Garano, partially enclosing the Gulf of Manfredonia, while in the hollow of the foot lies the deeply indented Gulf of Taranto. Many short rapid streams dart down the mountain slopes, but the chief rivers besides the 420-mile Po are the Adige, Arno, Volturno, and the tawny-sanded Tiber, the historic river of Rome. Our "boot" is 750 miles long and 350 miles in extreme breadth. In population it ranks fourth among the

states of Europe—next after Great Britain and just in front of France.

Its climate ranges from the ice-bound Alps and chilly winters of the north, through a sunny



IN VENICE—WONDER CITY OF NORTHERN ITALY

M. O. Henches

Venice is a city that has attracted the attention of generations of artists, because of its unique beauty and architectural grandeur. Its roads are waterways, and there are over 150 of these canals in the city. Of course, there are no omnibuses or taxi-cabs, but their place is filled by steamboats and the picturesque gondolas seen in the foreground of this picture, which is the view seen of the islands of S. Giorgio Maggiore from the Piazzetta of St. Mark across the Canal of S. Mark.



THE BOOT-LIKE SHAPE OF THE ITALIAN PENINSULA

It is easy to see from this map why Italy is often referred to as a "boot". It looks exactly like a booted leg, hanging from Switzerland as the body and about to kick Sicily into Africa. The "bones" of the leg are the rugged Apennines, which we can trace from France down the peninsula to Reggio. The northern boundary shown in black is that which was fixed as a result of the War of 1914-18, the white dots surrounding those portions of Italy which were formerly held by the Austro-Hungarian dual monarchy. The islands of Sardinia and Sicily also belong to Italy.

mellow phase, to a nearly tropical warmth in the southernmost section, where orange and lemon trees grow abundantly and the hills are "o'er-smoked by the faint grey olive trees". So blue are the skies and so bright and warm the air of most of the peninsula, so pleasant the life and so storied the land that poets have sung of Italy for centuries.

In fact, Italy stands today somewhat in the position of a fair dramatic masquerader, who has played such a romantic part that people dislike to lift the mask and look upon the well known workaday features of modern humanity. They want to think of Italy as the home of ancient Roman ghosts, of gorgeous medieval princelings, of "dark" politics in brilliant days,

of artists and singers and dreamers They are so bemused by her glowing art and radiant sunshine that they have almost ignored the strivings of her people today, in many ways finer than the loud greedy squabbles of Romans and Carthaginians, of Guelfs and Ghibellines, of Spaniards and French, in the long ago Cæsar's voice speaks clearer than Garibaldi's to most of us still

Italy, however, is not by any means a land of past glories and past achievements She is now a world leader, for instance, in commerce and industry Turning now to Italy herself, we find that it is in the north that the manufacturing industry of the country is centred In fact, we may think of Italy as divided into three sections—north, south, and central—so different are the interests and traits of these parts By northern Italy is meant Lombardy, Piedmont, Venetia, Emilia, Liguria and Tuscany

Here, more than elsewhere, is the hum of manufacturing, the bustle of restless modern cities, the unceasing trade through busy ports like Genoa and Venice Here fine silks are woven, white marble is quarried, motor cars and machinery made, wines pressed out, Leghorn hats woven, beautiful jewelry designed and fashioned, mirrors and majolica and glass ware of world fame manufactured Here fine farms produce grain, poultry, excellent cheese, potatoes, flax, and (in the wet areas) rice Here the people are better educated, more prosperous, progressive, and cool blooded, and many have fair hair and blue eyes, and contrast in their cool, sagacious realism with their more sparkling and warmer blooded brothers of central Italy

The latter includes Umbria, the "Marches," Abruzzi and Molise, and the Romagna In general one may say that most of the artists, musicians, and clever professional men of Italy come from the central section The district is chiefly agricultural, having but two large cities, Rome and Naples

In the south—in Campania, Apulia, Basilicata, Calabria, Sicily, and Sardinia—is the chief stronghold of superstition, ignorance, poverty, and backwardness The peasants plod along over the brown hills behind their great oxen, working painstakingly for 16 and 17 hours a day There are few cities in the south, and the people seem strangely content in their hard life, taking their troubles to their miraculous saints and madonnas, and grinding dreamily along in their old traditional ways

All Italians, whether of the north, centre, or south, are usually possessed of a Latin charm

and natural courtesy, a combined simplicity and cynicism, a quick temper and a kind heart They have a keener taste for luxury and finery than the English, perhaps, yet few English people could be so frugal, so patient at long dull labour, so gentle and unembittered in hardship The Englishman would fail through anger and contempt, where the Italian sings blithe and musical "stornelli" all the long hard hot day—as he trims his vines or tends his small neat fields, stopping only for the monotonous meals of macaroni, cheese, bread, and wine



MAKING ITALY'S FAVOURITE FOOD

Nowhere is so much macaroni eaten as in Italy and much of it is home made The paste made from a variety of hard wheat is the basis of macaroni, vermicelli or spaghetti Here women are making macaroni.

Now and then he has a lively holiday, at carnival time or at a country feast, but he needs no such constant beguilements as English people demand Yet, on the other hand, he will often defeat his own ends through some old and angry prejudice, and fall into dismal bickerings, and even into serious crime, like brigandage, over matters which the cooler Anglo-Saxon spirit would adjust with little public display

It is not easy to understand why the Italians should have acquired a name for laziness, for the job of building up the industrial structure of the country has been very strenuous indeed—building railways, mining coal, wrestling with the hardest labour They are not lazy, neither are they by disposition sluggish, or lacking in vitality, they are quick on the "uptake," whether in their faults or in their virtues

ITALY

Swarthy men and women of the Mediterranean race inhabited Italy in the Stone Age, and a substratum of this population exists to this day. The Latins, who founded Rome, were one of a group of fairer "Aryan" peoples, who came into the peninsula before recorded history begins. Etruscans, Greeks, and Carthaginians—Goths, Vandals, Lombards, Saracens, and Normans—all flowed over the land, leaving traces of their blood in the Italians inhabiting the country today.

Following the downfall of the Roman Empire in the West (*see Rome History*) and the fleeting rule of the barbarian kings, Odoacer the Herulian and Theodoric the Ostrogoth, came an equally fleeting reunion of Italy with the Eastern Empire. The Frankish conquests of the Lombards by Charlemagne, and his coronation at Rome in A.D. 800, checked for a time the breaking-up of Italy, but it was resumed with the rise of feudalism.

The refounding of the medieval empire by the Saxon Otho I (in 962), and his assumption of the "Iron Crown" of Italy, brought only nominal union of that land with Germany in the Holy Roman Empire. Even the rise of the powerful city states—Florence, Venice, Genoa, Milan, and their fellows—helped on the division and weakness by adding yet another important factor to the age-long conflict of Papacy and

Empire. The epoch of French and Spanish rivalries over Italy began with the triumphal raid of Charles VIII of France through the peninsula to Naples, in 1494. It closed with the recognition of the Spanish rule of Charles V over Sicily, Naples, and Milan, in 1544.

Thenceforth the bustling Greek-like cities of Italy, in which the Italian Renaissance had flowered in masterpieces of literature, art, and science, stood still under petty ducal houses. French Bourbons supplanted Spanish kings in Sicily and Naples in 1738, then the French Revolution and the conquests of Napoleon for a time overwhelmed the peninsula like an avalanche. But Bourbons and petty dukes alike came back in 1815, with the added incubus of Austrian rule in Lombardy and Venetia. As Metternich, the Austrian statesman, truly said, Italy had become nothing but a mere geographical expression.

A secret society called the *Carbonari* ("charcoal burners") flourished in the early part of the 19th century, with the overthrow of native and foreign despotism as its object. Not merely rude peasants but fiery patriots of the best families were among its members.

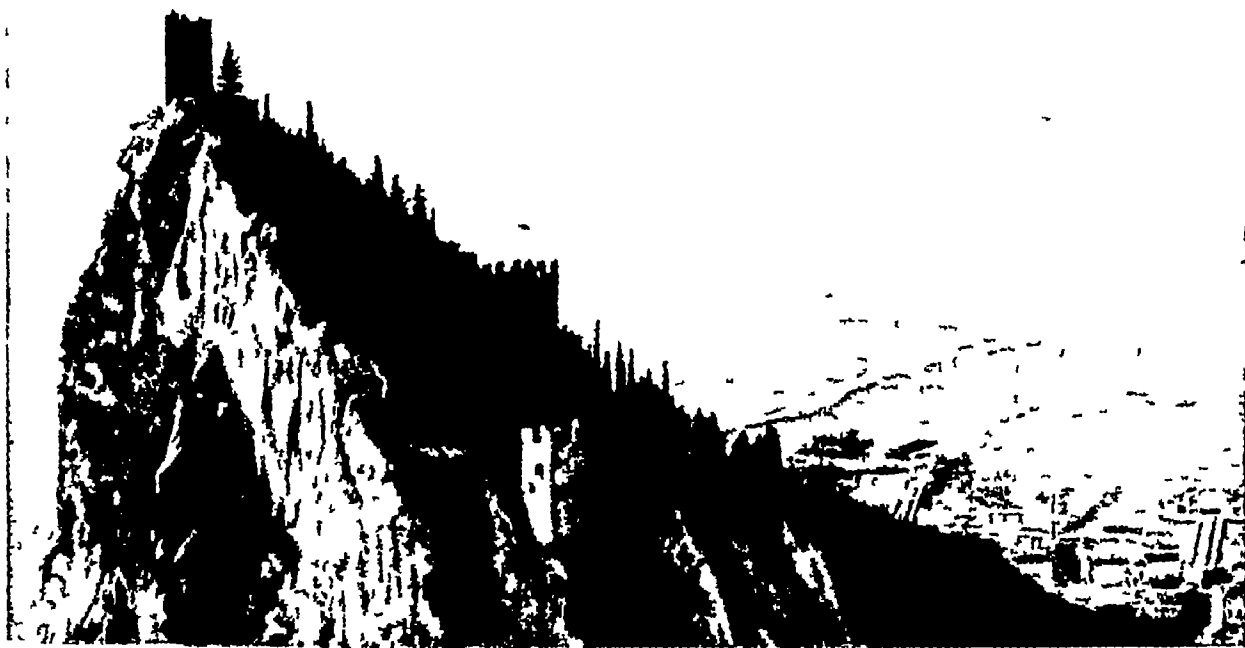
Revolts in 1820 and 1830, however, were crushed by Austrian troops. Then the idealistic republican, Giuseppe Mazzini, organized his new revolutionary society called "Young Italy."



ITALIAN PEASANTS DRYING THEIR CROP OF MAIZE

This quaint little village is inhabited mainly by peasants. Their staple food is maize, which they grow in very large quantities. Here you see how they spread the grain out to dry on the stones in front of their houses. When the sun has done its work, then the grain is fit to be stored until the time comes for it to be used.

A LOOK AT THE ITALIAN LANDSCAPE



The photograph at the top of this page shows a scene in Northern Italy, where the ancient city of Arco forms a semicircle at the base of a rock 930 feet high. The town lies on the river Sarca which follows a serpentine course through the mountains. In the south of Italy is the magnificent Bay of Naples seen in the lower photograph. The city's buildings form an amphitheatre on the hills while across the bay is the smoking cone of Vesuvius perhaps the world's most famous volcano.

Photos E & A



H. W. Nicholls

NARROW LANE IN OLD SAN REMO

San Remo is a favourite winter resort on the Italian Riviera, for it has an exceptionally mild climate, being backed by a semicircle of hills and faced by a bay of the Ligurian Sea. The old city has tall houses crowding together along narrow streets. The arches that span the street shown above are a safeguard against earthquakes.



D. McLeish

A GEM OF THE ITALIAN LAKES

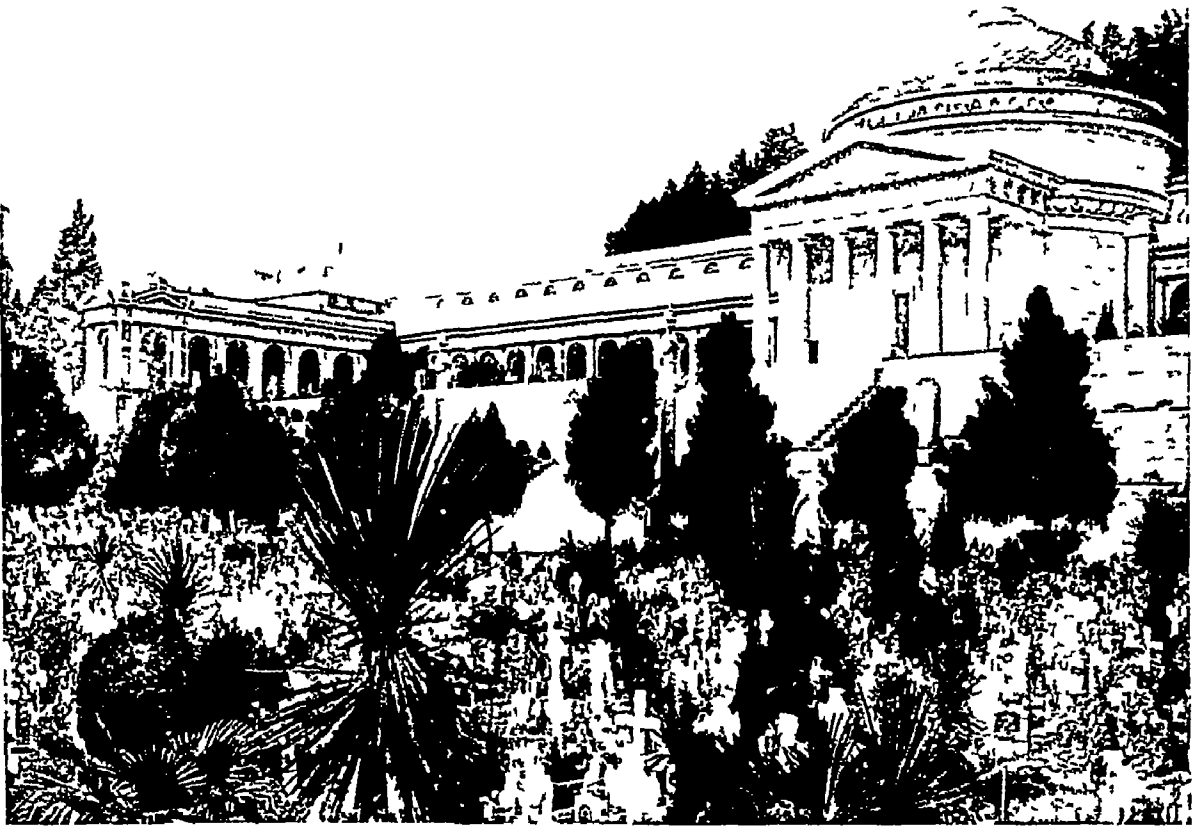
Lake Orta, one of the smallest of the northern Italian lakes, lies west of the more famous Lake Maggiore. Despite its smallness it has great beauty. This photograph was taken from above the village of Orta on the shores of the lake, looking towards the island of San Giulio. On the left of the island is seen the church founded in A.D. 379 by the saint from whom the island takes its name.



Kodak

SMILING BEAUTY OF THE ABRUZZI

The women of the Abruzzi, a department of central Italy, are famed for their beauty. This girl is a native of Clociaria, a region of forest and mountain in the Abruzzi, named from the peasant custom of wearing sandals. She wears the costume of the district, and her skirt is like a Scottish tartan, while over her arm she carries a plaid shawl.



THE BEAUTIFUL CITY OF THE DEAD IN GENOA

Italy is famous for the beauty and interest of its cemeteries and this is one of the most famous of them all, the Campo Santo Cemetery in Genoa. The Italian people take so much pride and delight in the cities of their dead that the French writer, Bazin, calls them "funereal pleasure-grounds". Of the parts of the cemetery occupied by the tombs of the wealthier Genoese, he says: "Nowhere is the stone made so supple, required to represent so many family scenes, so many trained and ruffled gowns with marvellous imitations of lace. These Italian cemeteries are like a great album of departed generations. On the tombs are frequently kept burning 'tall night lights in coloured glass, and always the bust with spectacles if the dead man wore them, or the photograph, framed and protected by glass'."

And while King Charles Albert of Sardinia Piedmont in the stirring days of 1848 battled unsuccessfully against the Austrians at Custoza and Novara, Mazzini drove out the Pope and set up a brave but ill-starred republic in Rome. French soldiers of Napoleon III, however, soon conquered it, and Italy was, as before, a dark realm of Austrian and Bourbon tyranny in the north and south, with the temporal power of the Papacy between. Only Sardinia Piedmont under its new king, Victor Emmanuel II, kept its constitution and the Italian tri-coloured flag.

But this, as it proved, was the seed from which Italian unity and liberty were to grow. Under the able leadership of that shrewd diplomat Count Cavour, the great minister of Victor Emmanuel, Sardinia Piedmont grew strong in resources and in alliances. Cavour had learned that, genuine as was Italian patriotic fervour, Italy would never be unified without help from abroad. Therefore he cleverly won the alliance of Napoleon III of France, and in the spring of 1859 Austrian declared war.

France and Sardinia Piedmont defeated the Austrians at Magenta and Solferino, and so won Lombardy for United Italy. But Napoleon, startled at the dust he had raised, hurriedly arranged matters with the Austrians, allowing them to retain Venetia. Cavour and Victor Emmanuel were clever enough to veil their disappointment and wait. At once the small states which chequered north-central Italy—Tuscany, Modena, Parma, and the Romagna—cast out their absolute princes and joined the victor of the north. Napoleon III consented to the arrangement, in return for the cession by Piedmont of the provinces of Savoy and Nice to France.

The second stride toward a United Italy came next year, when the famous soldier of fortune, Giuseppe Garibaldi, gathered about him his thousand volunteers, stormed the island of Sicily, and then the mainland part of the kingdom of Naples. The people everywhere hailed him as a liberator, and drove out the hated Bourbon king. There remained only the

YESTERDAY & TODAY RUB SHOULDERS IN ITALY



1 Two cypresses guard the village church at Orta on mountain-girt Lake Lugano, which lies partly in Italy and partly in Switzerland. 2 This Roman theatre is part of the ruins of Hadrian's villa in Tivoli, a suburb of Rome. The gardens, baths, terraces, and statues of the magnificent villa covered acres, and many of the famous places in the provinces were reproduced in miniature 18 centuries ago 3 As Pan piped, so pipes this Calabrian boy in his fur jacket 4 Now the city hall, the 14th century Palazzo Vecchio in Florence once housed the government of the Florentine republic. Savonarola was imprisoned in its tower 5 The Arms of Venice, showing the winged lion of St. Mark with his paw on an open book and the motto, "Peace to you, Mark, my evangelist," surmount the balcony on the side of the Doges' palace in Venice The Palace of the Doges, or Ducal Palace, dates from the 14th century, when Venice was a world power White stone and red marble are laid in a diamond pattern over the upper story, supported on decorated columns. 6 The monastery of St. Francis, with its two churches, was built in the hill town of Assisi in 1228, two years after the death of St. Francis, and contains the crypt of the saint Art treasures in the churches are delicately coloured frescoes by Giotto and Cimabue 7 Sardinian women bake bread in outdoor ovens

ITALY

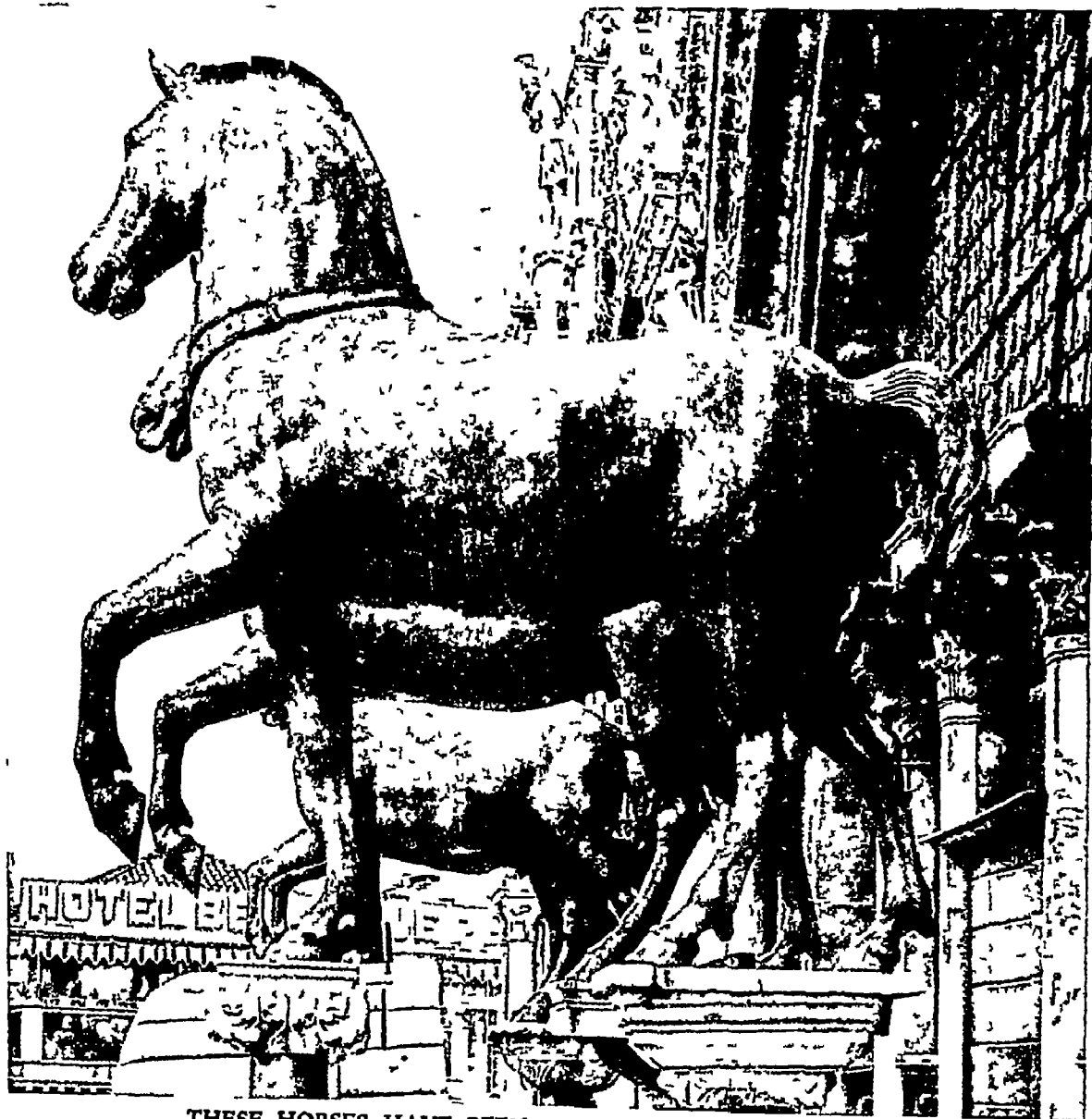
Papal States and Venetia to be joined to the new-made Italian nation, when (in February, 1861) Victor Emmanuel of Sardinia was proclaimed king of Italy. Venetia was gained in 1866, after Austria was defeated by Prussia.

Rome alone was now outside the Italian kingdom, and the lack of that central strip of territory was a very real handicap.

French troops still guarded the Pope's sovereignty, and Victor Emmanuel was too intelligent a pupil of Cavour (who had died in 1861) to attack the French and thus, perhaps, undo all that had been accomplished. Once more he let "the stars in their courses work for Italy." In 1870 the Franco-Prussian War forced France to withdraw her soldiers from

Rome. The Roman people welcomed the army which Victor Emmanuel marched into Italy's ancient capital. Pope Pius IX, excommunicating the invaders, withdrew into the Vatican, where he and his successors remained "voluntary prisoners" until the Concordat of 1929 between Italy and the Holy See recognized the temporal power of the Pope as sovereign ruler over the Vatican territory.

Giant tasks lay before the new Italy. Though staggering under a load of debt and heavy taxation, it built up a strong army and navy, and developed railways, ports, schools and a mercantile marine. Manufacturing industries sprang up, bringing with them labour troubles and class struggle. In 1900 King Humbert,



THESE HORSES HAVE BEEN PRANCING FOR 2,000 YEARS

There stand in Venice perhaps the most famous horses in the world. Four of them in bronze stand over the central portals of San Marco looking out upon the square. They were made at Corinth nearly 20 centuries ago. Nero took them to Rome. Constantine took them to Constantinople, thence they were moved to Venice. They were carried by Napoleon to Paris and after his fall, returned to San Marco. During the World War they were taken down once more and hidden away.

ITALY

son of the first king, Victor Emmanuel II, was assassinated by an anarchist. His son, Victor Emmanuel III, the present king, succeeded to the throne. In 1908 an earthquake destroyed the city of Messina in Sicily and killed 77,000 persons. Another terrible earthquake took 30,000 lives in central Italy in 1915.

Meanwhile Italian statesmen were attempting to gain territory in Africa for colonial expansion. On the east coast they obtained two colonies of doubtful value, Eritrea and Italian Somaliland, and on the north coast they won Libya (Tripoli) after war with Turkey (1911-12).

The World War of 1914-18 added large tracts of land formerly under Austrian rule, including the "unredeemed Italy" of the Trentino in the north, and the peninsula of Istria at the head of the Adriatic. In spite of a terrible reverse at Caporetto, the brilliance and perseverance of the Italian troops struggling with the Austrians in the Alpine passes, and then heroic stand when rallied on the Piave River, had proved the vigour which the new-won freedom had put into Italian blood.

However, all was not well with Italy. When it entered the war, Italy had been torn in two by the advocates of neutrality and the pro-war faction. At that time a young revolutionary, Benito Mussolini, editing the Socialist newspaper *Avanti*, in Milan, was discharged from his position and expelled from the Socialist party because he preached with fiery words that Italy ought to join the allies in the war. He enlisted, was wounded, and was decorated for valour. He returned a hero and an enemy of Socialism.

For at that time Socialism seemed to drift towards Bolshevism. Returning soldiers were mocked in the streets. Patriotic receptions of the troops were prevented. Strikes paralysed industry. Bands of former service men roamed the country, angry, embittered, dangerous, eager to strike a blow against the evils which menaced their country.

In these bands Mussolini saw his opportunity. With his gift of eloquence he soon organized them into groups in each community, armed

them with sticks, and set them to righting the most obvious wrongs and to preserving order. Each group was called a *Fascio* (which means "bundle" or "bunch"), in token of the close union of its members, who were called *Fascisti*. For the emblem of the organization they took the bundle of *fasces*, or rods, which the old Roman lictors carried as a symbol of authority. (See Fascism).

In 1919 the soldier-poet Gabriele d'Annunzio launched his attack on the seaport of Fiume (which was finally awarded to Italy by treaty in 1924) and stirred the whole nation to a high degree of national fervour. More and more young Italian "Black Shirts" took the Fascist oath: "In the name of God and Italy, in the

name of all those who have fallen for the greatness of Italy, I swear to consecrate myself, exclusively and increasingly, for the good of Italy."

When the Radical element called a general strike the next year the Fascists were strong enough to end it, and also to break up a Socialist reunion in Rome the year after, strong enough in 1922 to call a Fascist congress in Naples. The Government, which had been too weak to control the Radicals, was obviously too weak to control the men who had put fear into the Radicals. It offered the Fascists any portfolio except that of Minister of the Interior. This was conclusive

proof of the Government's weakness, so in October 1922, the victorious Fascists marched on Rome. The Cabinet resigned, Mussolini formed a new one, took the portfolios of the Interior and of Foreign Affairs, and became the real ruler of Italy.

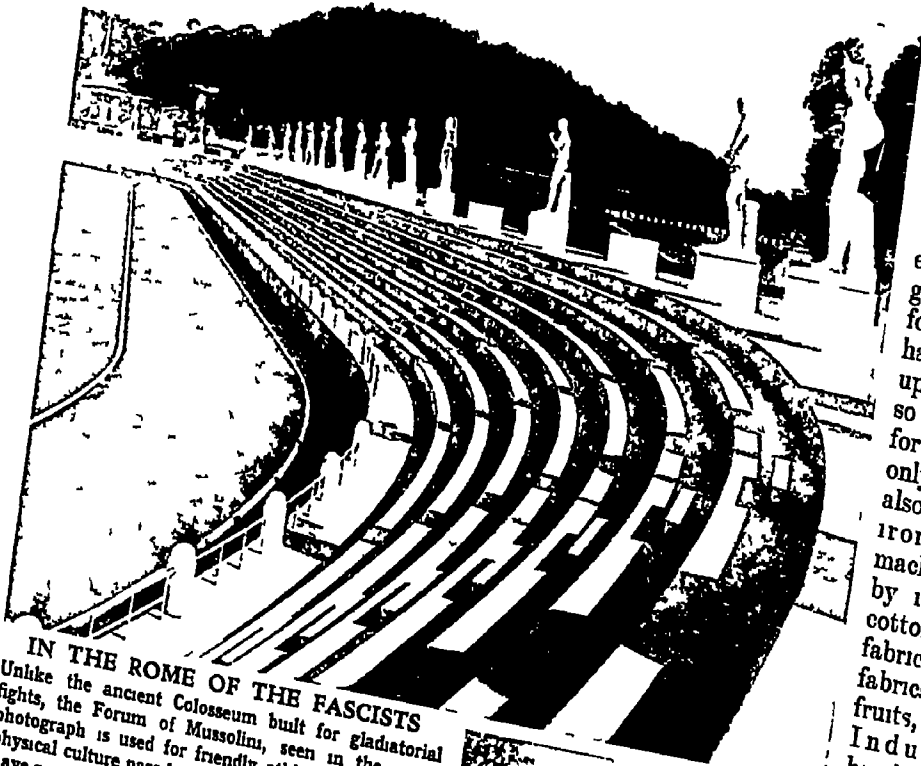
Within a few years Mussolini had made such drastic changes in the Government that no semblance of popular sovereignty remained. Italy still has a king, but the supreme power in the state rests with the Prime Minister, who appoints and directs the Grand Fascist Council. This consists of the Cabinet Ministers and various other Fascist officials and leaders, with the Prime Minister—at present Mussolini, who is *Il Duce* (the leader)—at its head.

There are no elections in the ordinary sense of the word. The deputies are named by the



GARIBALDI GREETES HIS KING

Garibaldi led an army of volunteers into Sicily and drove out the thousands of Bourbon troops. Passing into Italy, he went to Naples, where he welcomed Victor Emmanuel as king of Italy. They are seen together above.



IN THE ROME OF THE FASCISTS

Unlike the ancient Colosseum built for gladiatorial fights, the Forum of Mussolini, seen in the upper photograph is used for friendly athletic contests and physical culture parades. Italy's modern motor roads have no speed limits but are patrolled by special motor police two of whom are seen in the lower picture, with an ordinary policeman standing between them.



There are four entirely new towns—Littoria, Sabaudia, Pontina, and Aprilia—in this reclaimed region.

Despite its best efforts, Italy cannot grow enough food for home use. It has tried to build up its manufactures so that it can pay for its imports not only of wheat but also of cotton, coal, iron and steel, machinery, and oil, by its exports of cotton goods, silk fabrics, rayon, wool fabrics, raw silk, fruits, and wine. Industry is handicapped, how-

The private citizen has no voice in public affairs except through membership of his local "syndicate"—an organization of workers and employers engaged in a certain trade.

This "corporative state" is based on the Fascist doctrine of the unlimited supremacy of the state. The Fascists hold that the individual exists only for the state, and has no rights as against the state. They reject popular government and majority rule. They believe that government should be administered by a limited group of qualified leaders, whom all must obey. There is only one political party and no opposition is tolerated.

To meet the needs of its increasing population, the Italian government has promoted agriculture in various ways. Only about half of the country is adapted to farming, and hence all available land is being reclaimed by irrigation and drainage. Enormous tracts have been drained in the Maremma, or swamp lands, of Tuscany, in the Roman Campagna (Agro Romano), in the Pontine Marshes (Paludi Pontine) and in districts of Sicily and Sardinia. The Pontine region, from which malaria had once driven all inhabitants, became the fertile Littoria province in 1934.

ever, by the lack of minerals and other raw materials. There is a little iron, chiefly on the islands of Sardinia and Elba, on the Tuscan mainland and in the high Alps in the province of Aosta, and some coal is mined, chiefly in the newly acquired province of Istria, but not sufficient. To make up for the lack of coal on the Italian mainland, there has been a

tremendous recent development of water power, furnished by the many mountain rivers. In hydro-electric power, Italy now leads all Europe.

Two considerable sources of revenue used to be the expenditure of tourists and money sent home to relatives by Italians living in foreign countries. But income from these sources has dwindled, partly because of Fascist currency policies and partly because of dislike in foreign countries for the Fascist regime.

Meanwhile the cost of government has mounted enormously. Great sums were spent on a unified educational system, in the effort to end illiteracy and to get all the people to use the official Tuscan language instead of the 15 provincial dialects. Public works—like the building of the admittedly magnificent arterial roads known as *autostrade*—also absorbed large sums. But the greatest expense was incurred in building up a powerful army, navy, and air force, and in the military training of youth. The internal debt rose to staggering heights.

As a way out of these many difficulties, Mussolini decided on colonial expansion in East Africa, at the expense of Abyssinia. Once

before, in 1896, Italy had attempted this, but had been disastrously repulsed at Adowa. Il Duce now planned with one bold stroke to wipe out the memory of this defeat and gain new territory which would supply raw materials and furnish an outlet for surplus population. A clash between Italian and Abyssinian troops on the border of Somaliland afforded the pretext, and on October 2, 1935, bombing planes, troops and tanks from Eritrea and Italian Somaliland began the invasion. Four days later Adowa fell.

The League of Nations imposed sanctions (penalties) against Italy as an "aggressor" nation, but the all-important supply of oil, without which Italy's war machine would have been paralysed, was not cut off. The Italians reached Addis Ababa in seven months, Abyssinia was annexed in May 1936, and the King of Italy was proclaimed emperor of the new "Italian Empire in East Africa."

In April 1939 Italian forces invaded Albania and overcame the resistance of the Albanians and King Zog and his Court fled the country. Although nominally Albania remained a sovereign state with a separate government the Crown was accepted by the King of Italy.

ITALIAN ART *through the* CENTURIES

Italy has produced more "old masters" than any other land, and it is on their principles and practice that painting has developed. We read here of the long procession of painters that are her greatest glory.

Italy, ART OF For a space of almost two thousand years, from the later days of the Roman Republic to the seventeenth century, there came from Italy a high proportion of the finest works of art in the world. It is naturally impossible here to do much more than indicate the names of some of the greatest of the artists, not painters only, but architects, sculptors, and workers in gold, jewelry and other media. You will find the early work under the heading Rome. Art and Architecture, here we start with the lovely mosaics that, from A.D. 300 onwards, were used in Rome for the decoration of churches and other buildings. They illustrated Biblical subjects and incidents in the history of the Church. Later, the art moved to Ravenna, where the colour and design were still of the highest standard, with an interest in the reproduction of natural forms far ahead of that seen in the Byzantine mosaic work.

There was, too, a strong school of mural painters at Rome, whose work is of great merit, especially during the 8th century, but it is with the coming of Cimabue, in the 13th century, that painting was really revived in Italy. It was through him that painting became a new, living art, divorced from the strained and artificial formalism of the Byzantines. It is known that he did frescoes and numerous

altar-pieces, but perhaps nothing now remains that can be definitely assigned to him.

It is, therefore, to his pupil, Giotto, that many people would credit the sure foundation of the new art. This great master (see Giotto) drew his inspiration largely from Nature, painting "like the life" and giving to his masterpieces, such as the series of paintings of the life of St. Francis of Assisi (see page 1743), a liveliness and a human quality that was lacking in previous works. Giotto's numerous followers, who include many of the best Italian painters of the 14th century, were called *giotteschi* after him. The chief among them was Andrea Orcagna (c. 1308–c. 1368), better known as a sculptor and architect, who did some very fine frescoes.

Contemporary with these painters there was another great school, working at Siena. In this the influence of Byzantine art is more obvious, but there is the same completely novel air about it that marked the work of the Florentines. The three great Siennese of this period were Duccio (c. 1260–1318), Simone Martini (1283–1344), and Lippo Memmi (d. 1356).

Returning to Florence, we find in the next period, that of the Italian "Quattrocento," Fra Angelico (1387–1455), famed for the religious intensity and the great and moving beauty of

ITALY: ART

his paintings. Within his lifetime lived Masaccio (1400-1438), the first man to make his figures really living people, and considered by many people as the real father of all later paintings. A follower of Masaccio was Ucello (1396-1475) who, if he did not actually invent perspective, at least studied it to such an extent that many of his works are exercises in this type of drawing. Andrea del Castagno (c 1410-1457) and Fra Lippo Lippi (1406-1469) were other great painters of this time, the latter doing some very tender and beautiful religious paintings. He must not be confused with his son, Filippino Lippi (1457-1504). Verrocchio (1435-1488), more sculptor than painter, was the teacher of Perugino and of Leonardo da Vinci, and a master of figure drawing. Another great name of this time is that of Sandro Botticelli (1444-1510), one of the artists whose works have captured the imagination of the whole world, and who took for his subjects the scenes and myths of classical antiquity. Finally, before the end of this period in Florence, Ghirlandaio (1449-1494) was at work, a prolific fresco artist and portrait-painter.

During this century another great school had arisen in Umbria, whose masters produced more simple, restrained and peaceful work than that of the Florentines. Piero della Francesca (c 1423-1492) was a member of this school, Perugino (1446-1523) and Pinturicchio (1454-1513) were others. Yet another school, destined to outlast all of these in the end, was that of Venice. Of the Venetians it has been said that they appreciated better than anyone else the pictorial value of a painting. They were influenced at first by the great painter of Padua and Mantua, Andrea Mantegna (1431-1506), whose work has a character all its own—grand in conception and execution and with a curious hard brilliance. But the real masters of Venice

at this time were the Bellini. The first of these was Jacopo (c 1400-1470), but his sons Gentile (c 1429-1507) and Giovanni (c 1430-1516), were better painters. The Bellini, though not the first painters to work in oils in Italy, were the first great ones really to profit by the adoption of this medium, which was brought from Flanders by Antonello da Messina (c 1430-1479). Contemporary with them worked Cimabue (1459-1517) and Carpaccio (c 1460-1520), two strongly contrasted painters—the one tranquil, lovely and unsophisticated, the other

vigorous, rough yet technically brilliant.

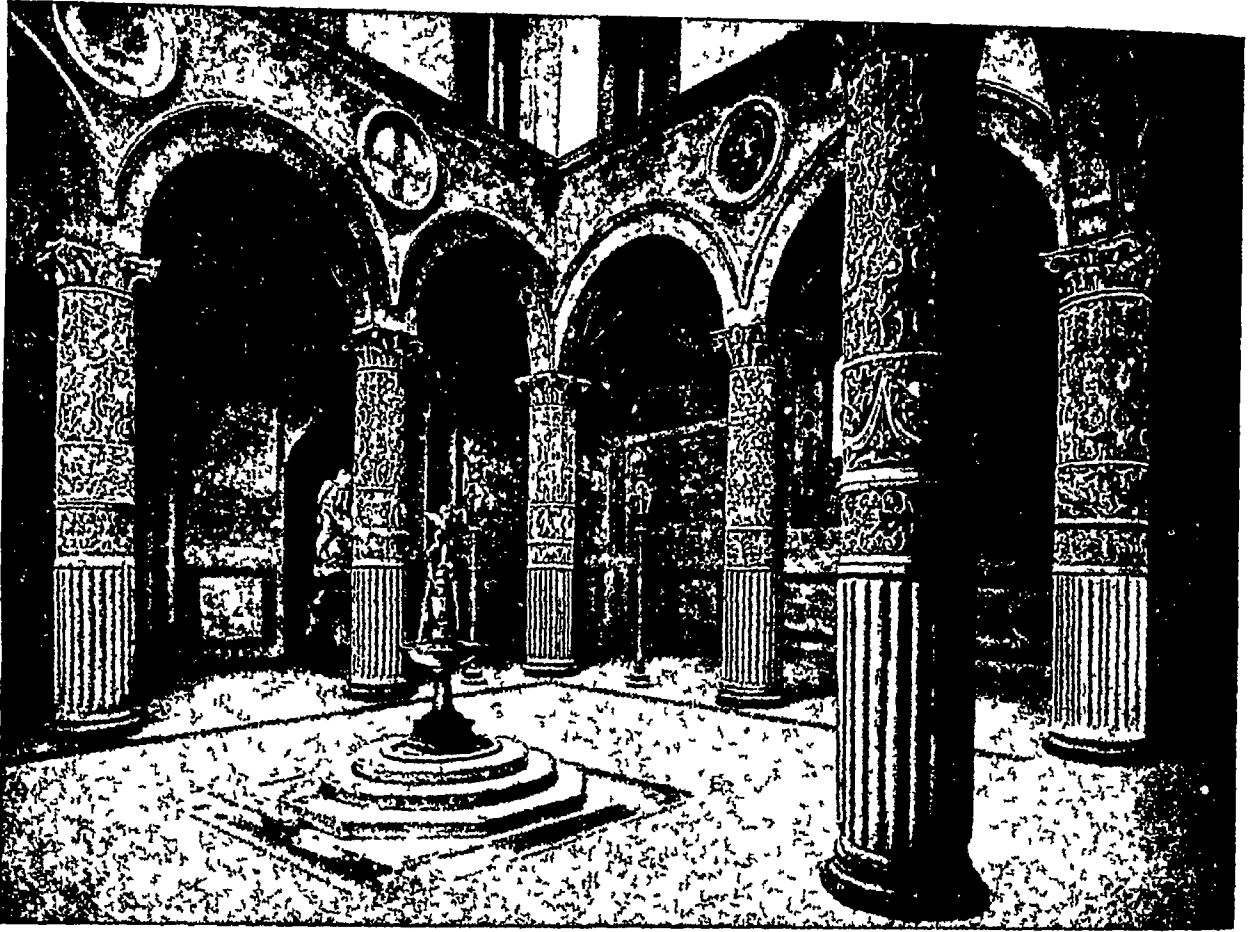
The Venetian school reached its greatest heights in the next century, with the work of Giorgione (c 1477-1510), Titian (1477-1576), Tintoretto (1518-1594), and Paolo Veronese (1528-1588). Giorgione is known now by only a few works of great beauty, a set of four small paintings claimed to be by him were bought by our National Gallery in 1937. Titian, one of the mightiest figures in all Italian art, is famed for his tremendous vitality, glorious colour, perfect draughtsmanship and generally magnificent atmosphere. In vitality he is rivalled in some ways by Tintoretto (1518-1594), who is also remarkable for the size of his paintings, which were done



A GUERCINO MASTERPIECE

This fine painting, 'Elijah fed by the Ravens,' shown at Burlington House in 1938, shows several interesting points. Guercino, the Bolognese master of the 17th century, used the strongly-contrasted light and shade which marked the school of Caravaggio, but in his nobler feeling and fine colour he was influenced by the Carracci.

at a tremendous speed and with a sureness of touch that amazed even his contemporaries. Paolo Veronese, who also executed many enormous canvasses, was a great designer, giving as much attention to the settings of his subjects as to the figures themselves. Finally, the Venetian school was continued much later by Tiepolo (1696-1770), the greatest of baroque decorators, and by the topographical painters, Canaletto (d 1768), Bellotto and Francesco Guardi (d 1793), of whom the last, especially, executed some extremely lovely paintings of Venice during the last period of her greatness.



GLORIOUS DECORATION OF A FLORENTINE PALACE

The Palazzo Vecchio, or "Old Palace," was built at the beginning of the 14th century to house the government of Florence. Today it is used as the City Hall. In contrast with the severe grandeur of the exterior, the courtyard of the palace is elaborately decorated in the later Renaissance style. The figure of a boy surmounting the fountain is the work of the great sculptor Verrocchio. The Medici coat of arms is above the pillar in the right background.

An isolated figure, in that he worked largely at Milan and belongs to no school, is Leonardo da Vinci (1452-1519) (*see* Leonardo), he is classed with the 16th century although he lived chiefly during the previous one. Not many of his pictures are extant, but those remaining show him as a master of portraiture, of fresco and of art in its highest sense. Yet his influence was less than that of Michelangelo (*q v*), who regarded himself as a poor painter. His interest was in sculpture, and that is why his figures, generally nude, have such solidity and force.

The third great figure in Italian painting at this time is that of Raphael (1483-1520), whose finest paintings have unique spiritual beauty. He worked at Perugia, at Florence, and at Rome, where he executed superb frescoes for the Vatican (*See* Raphael).

Besides these three "giants" there were unnumberable other fine painters during the "Cinquecento." At Florence worked Piero di Cosimo (1462-1521), who was influenced by Leonardo and by Andrea del Sarto (1486-1531), "the faultless painter," whose technique was perfect, although his figures lack power. At Bologna, the Caracci did what the Bellini had done earlier at Venice, founding a very distinct

school and rising to great heights themselves. The greatest was Annibale Caracci (1560-1609), who is especially interesting as perhaps the first Italian to paint landscape for its own sake, not merely as background. Domenichino (1581-1641), Guido Reni (1574-1642), and Guercino (1591-1666) were notable followers of this school.

Considerably earlier than any of these painters was a great painter who came from Parma, namely, Correggio (1494-1534), who became famous only after his death. His most marked qualities were a certain joyousness of expression and a remarkable fondness for foreshortening and light and shade—an aspect of painting which also attracted Caravaggio (1569-1609).

Great as was the influence of Italian painting, it is strange to find that after the 17th century there were practically no Italian painters of repute. In the present century, however, we have had from Italy one of the most remarkable of all movements, Italian "Futurism."

Besides painting, Italy for centuries led the world in sculpture, and such men as Verrocchio and Michelangelo excelled in both arts. It was, too, the birthplace of the greatest of all metal workers, Benvenuto Cellini, and of Della Robbia, whose "bambinos" are famous.

MASTERPIECES OF ITALIAN ART



It is as painters of religious subjects that the Italian masters excel above all and as a religious painter Raphael whose real name was Raffaello Sanzio or Santi was perhaps the greatest of all. No subject seems to have attracted him or called forth the very best of his art so much as the Madonna and Child and this lovely 'Madonna del Gran Duca' is one of many such paintings by him. It shows how well he deserves his great reputation as an artist of wonderful grace, tenderness and technical ability.

Pitti Palace Florence photo Anderson



'THE ROUT OF SAN ROMANO'—AN EXERCISE IN PERSPECTIVE BY UCCELLO

Although he may not have been the actual re-discoverer of perspective, the Florentine painter Uccello became famous for the attention which he paid to this branch of drawing and many of his finest subjects, such as that above, seem to have been chosen mainly from the point of view of problems in this difficult art. The scene painted here is the defeat of the Siennese by the Florentine forces in 1431, for the two great cities were political as well as artistic rivals. Full of action and with a pleasantly childlike atmosphere, the battle seems almost more play than war. But a close study of the picture will show how cunningly the perspective problems are dealt with by a master-draughtsman

National Gallery London

CHRIST'S NATIVITY PAINTED BY BOTTICELLI



This beautiful and unusual painting is not a straightforward representation of the Nativity of Our Lord but is rather an allegory. The inscription along the top explains this and states that it was done in 1500. Notice the two shepherds on the right and in the background the multitude of the heavenly host. Like other painters of his time, Botticelli has clothed his figures in the costume of his own day.

National Gallery London photo Mansell

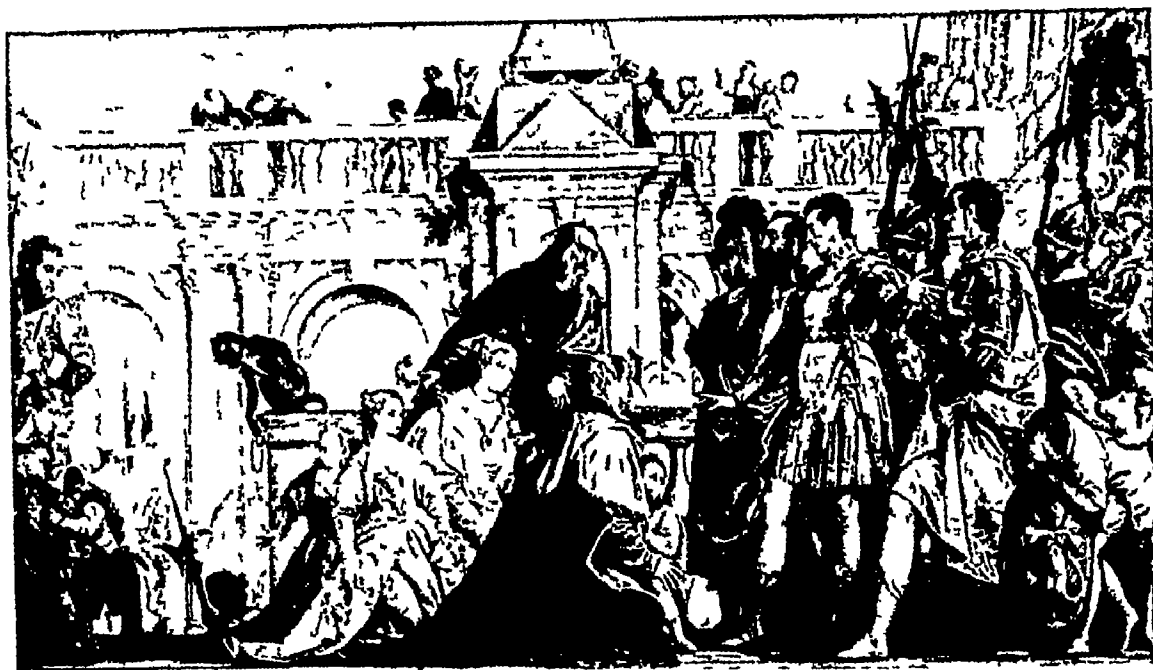
SAINT CHRISTOPHER AND THE CHILD



Titiano Verelli, whom we know better as Titian, created this fresco, which illustrates the legend of how the giant St Christopher, carrying a small child across a river, exclaimed "Had I borne the whole world upon my back, it could not have weighed heavier than thou!" "Marvel not," the child replied, "for thou hast borne upon thy back the world and Him who created it."

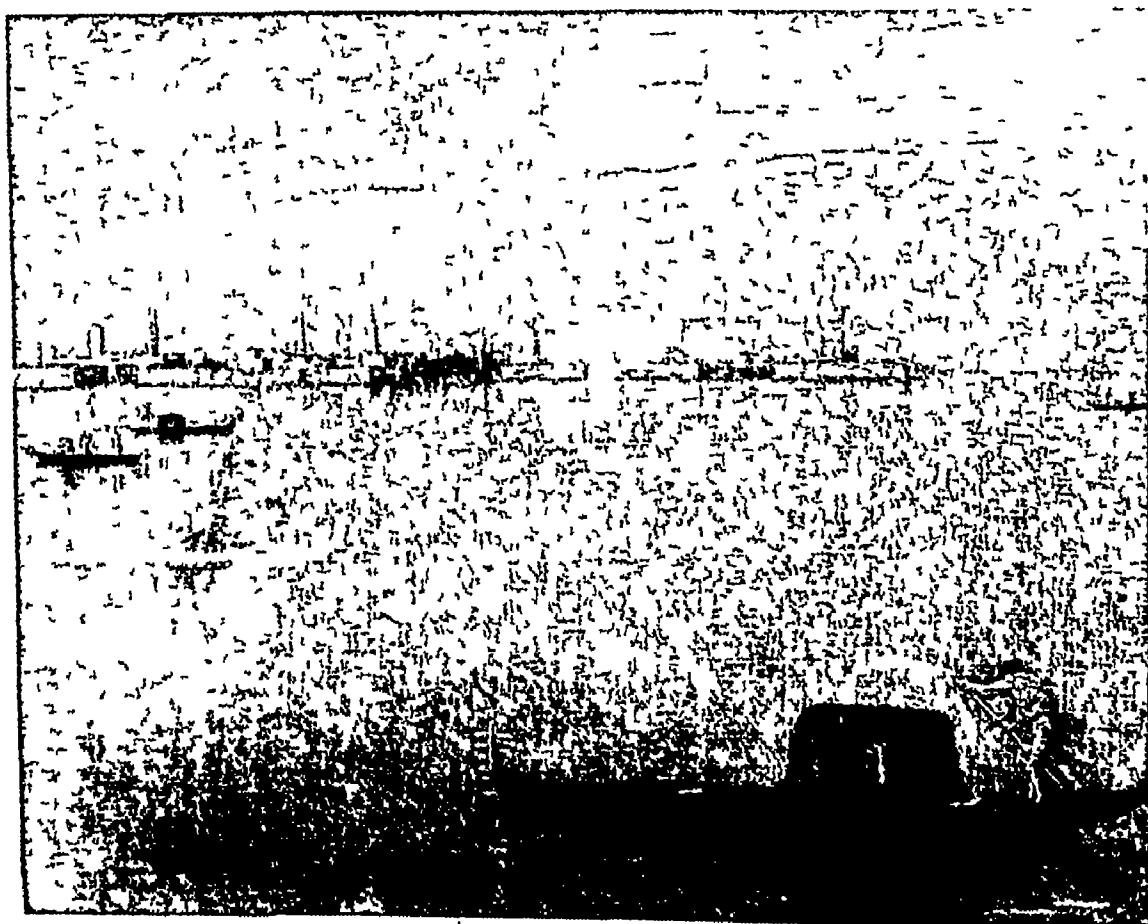
Ducal Palace Venice photo Anderson

VENETIAN CONTRASTS IN SUBJECT AND STYLE



This fine painting "The Family of Darius before Alexander," is a typical work of the painter Paolo Veronese or Caliari who specialized in large colourful pictures, in which the setting is often as important as the design. Here the captive family of the Persian king are being presented to the young Macedonian by one of Darius's ministers. Actually, these principal figures are all portraits of the Pisani family for whom it was painted.

National Gallery London



Although the Venetian school continued to produce fine painters when most others in Italy had long passed away, their work was very different from that done in the heyday of Italian art. Typical is this "Scene on the Lagoon" by Francesco Guardi, who is famous for such peaceful lovely paintings in which Venice is portrayed with delicacy of touch as well as of colour—the latter usually silvery greys, blues and greens.

Oldi Pezzoli Museum Milan photo Allnari

DIGNITY IN THE PORTRAIT OF A DOGE OF VENICE



The founders of the Venetian school were the members of the Bellini family, one of whom, Giovanni, painted this portrait of Leonardo Loredano, Doge of Venice in 1501. When they turned their hand to portraiture, the Italians brought to it the same strength and technical skill that made them pre-eminent in other types of painting. What power and dignity has this face, and with what skill and cunning are the details of the costume rendered! On the Doge's head is the ducal cap of office.

National Gallery London photo Mansell

PATRIARCH PORTRAYED BY A MASTER-SCULPTOR



Whether as sculptor or painter the figure of Michelangelo stands out for his tremendous power and dynamic energy and even a seated figure such as this wonderful statue of Moses from the church of St Peter ad Vincula in Rome impresses one by its restless energy. Moses is here shown with horns which on account of an ancient misreading of a passage in Exodus xxxiv he is supposed to have had when he returned from Mount Sinai with the tables of the Law.

Photo Anderson

FINE RENAISSANCE SCULPTURE & METALWORK



Verrocchio, sculptor of the monument to the great Venetian soldier of fortune, Bartolommeo Colleoni, was famous also as a painter, but this monument is generally considered his greatest masterpiece. As an expression of power and dignity it stands among the world's greatest sculptures. The glorious salt-cellar, below, is the work of Benvenuto Cellini, the finest goldsmith the world has ever had. Done by him for Francis I of France, it is made of pure gold, and shows Poseidon (Neptune) and Aphrodite (Venus) reclining above a sea full of dolphins.

Top Venice photo Anderson bottom Imperial Treasury Vienna photo Wolfram

GREAT WRITERS in the ITALIAN TONGUE

The history of Italian literature begins late—just before the Renaissance, but it contains some of the world's greatest names, particularly in its earliest periods. Who they were and what they wrote is told here

Italy, LITERATURE OF The Italian language has descended in the direct line from ancient Latin, which it most resembles of all the Romance languages. The sonority and rhythm which French has lost, the delightful clearness which has become rather blurred in Spanish, all remain in melodious Italian, the ideal language of poetry, in which it has always excelled.

Yet modern Italian, being to a large extent a forced bloom, suffers in many respects from its artificial growth. For in the Middle Ages, while literary Latin of a sort continued to be used as the learned and cultured language, the mass of the people of Italy, mingling the old low Latin of popular speech with imported foreign elements, contrived to form it into a score of different dialects.

Then came the great Dante, who selected the dialect of Tuscany for his literary work, and revealed its strength and beauty in his epic masterpiece, "The Divine Comedy." Petrarch and Boccaccio followed him, and wrote immortal lines in Tuscan—beautiful verse in the one case, and prose stories in the other. Thus this dialect became the fixed literary language of Italy, and is today so recognized.

But the many other dialects still exist, and their words tend to creep in, not always elegant or well-conceived, and it is here that the struggle between the classic but often cramped Tuscan and the cruder but more vigorous popular dialects places the Italian writer at a loss. This artificiality and limitation of Italian, in spite of its rich sweetness, is therefore to be reckoned with in explaining why Italian writers of all times, and especially the present, are not as numerous as in other countries. But it has with equal truth been said that

Italian writers must be weighed, not counted. If they have been few, they have also been worthy to rank among the greatest

Latin long remained in Italy more nearly a living tongue than elsewhere, and hence a written literature in the vernacular, or people's language, was slow in arising—hardly existing before the beginning of the 14th century.

Late as it was in starting, this literature attained its greatest glory almost immediately, far outshining all other literatures of the period. Dante wrote his "Divine Comedy" a century before Chaucer and three centuries before Shakespeare. Petrarch followed with his immortal sonnets to "golden haired" Laura, and Boccaccio with the "Decameron."

But with the great revival of interest in the ancient Greek and Latin literatures, which was also a feature of the Renaissance, the new Italian literature declined. The brightest spirits sought their inspiration in antiquity, and the newly formed Italian tongue suffered through an affected and elaborate striving for Latin elegance.

It was not until the 16th century that Italian writers returned to a natural and spontaneous



PETRARCH AND HIS FRIEND BOCCACCIO

The writings of Petrarch Francesco Petrarca (1304-1375) left had much to do with the revival of learning in Europe. Although a writer of admirable Latin verse and prose, he is remembered primarily as a lyric poet. About 1350 he developed a friendship with Giovanni Boccaccio (1313-1375), right author of "The Decameron." Both these portraits are by Andrea del Castagno.

After Alinari

style This century has been called the "golden age of Italian literature," not because it produced men of supreme greatness, but because of the large number of pleasing and competent writers who appeared The best known of these are Ludovico Ariosto with his masterpiece "Orlando Furioso," and Torquato Tasso, whose "Gerusalemme Liberata" (Jerusalem Delivered) is a reaction against the worldliness of religion in his time, expressed in thunderous verse

Tasso's claim to immortality rests on two works alone—the wonderful epic that has just been mentioned and his pastoral play "Aminta" He was engaged on the former from 1563 till 1575, and a heated controversy sprang up immediately the poem was published

The fusion of the classical and the romantic style showed a marked advance on his earlier work, "Rinaldo," an epic he had published at Siena in 1562 But criticism of matter and manner was severe, and Tasso attempted a reply in "Gerusalemme Conquistata," which, however, was a complete failure

His life was full of tragedy—a hopeless passion having disturbed his mental balance He had to be put under restraint at different times, finding a final refuge with the Aldobrandini at Rome, where he died in 1595

Ludovico Ariosto, both in temperament and outlook, differed from Tasso He was born in 1474, and came of an ancient and noble family He had been studying law for five years when he found his vocation for poetry

Whilst acting as the attendant gentleman to Cardinal Ippolito d'Este he pursued his fancy without neglecting his duties, and in ten years he had completed 24 cantos of his great epic "Orlando Furioso" Later, the poem was added to, and first appeared complete in 1532

Whilst the volume of his output was not great, his work reached a very high standard,

and he has five comedies and many graceful sonnets to his credit

During the 17th and the first half of the 18th century Italy suffered from a grandiose literary style and an emptiness of literary ideas It was not until the advent of Count Vittorio Alfieri with his tragic plays, in the second half of the 18th century, that Italy was aroused to a sense of the emptiness of its recent literature Alfieri also started a wave of Italian patriotism—the conscious stirrings of an Italian desire to be rid of the petty tyrannies and foreign control which had torn the land for centuries

Out of this new patriotism grew many romantic dreams, touched with intense political reactions, which gave the Italian literature of the 19th century—the century of Italian unity and freedom—a new vigour Starting with Vincenzo Monti, who sings in heroic notes the conflicting sentiments of the early period, the tendency soon leans towards the romantic school of Alessandro Manzoni, the poet of the "Fifth of May," and the novelist of "The Betrothed"

With the awakening of Italian national consciousness came a reaction against the imitation of foreign literature, and a desire to depict the life and thoughts of the Italian people

New writers began to see Italy with new eyes Giosue Carducci

in verse, and Matilde Serao and Antonio Fogazzaro in prose, wrote of Italy and things Italian, with a really native point of view, expressing the new patriotism

Overshadowing all other Italian writers in the first quarter of the 20th century was the figure of Gabriele D'Annunzio He was famous as poet, novelist, and dramatist before the World War His exploits as an airman during the War added immensely to his popularity Of more recent renown are Luigi Pirandello, Sem Benelli, Giovanni Papini, and Benedetto



GABRIELE D'ANNUNZIO

The career of Italy's famous poet Gabriele D'Annunzio was a strangely romantic one, and his exploits as an airman during the World War and his subsequent dictatorship in Fiume gained him the admiration of the Italian people He is here seen in his motor-boat on Lake Garda

Croce Pirandello's "Six Characters in Search of an Author" has been widely translated, and was a theatrical success in England and America. Croce is one of the world's leaders of philosophical thought.

Ivan. GRAND DUKES AND TSARS OF RUSSIA
Six rulers of Russia have borne the name Ivan, the Russian for John. Some of them ruled before the country was called Russia, and they were known as the Grand Dukes of Moscow. The foundation of Tsarist Russia was the work of the third and fourth rulers of the name.

IVAN III, who ruled from 1462 to 1505, freed his country from the Tartars by refusing to pay tribute to the Great Khan. He conquered the wealthy city of Novgorod and annexed it with other cities and states to his dominion.

He took the title of emperor and adopted the double-headed black eagle as the Russian emblem. He fostered art and learning, encouraged industry, and was responsible for the introduction of civil laws. Because of the importance of his work he is known as "Ivan the Great."

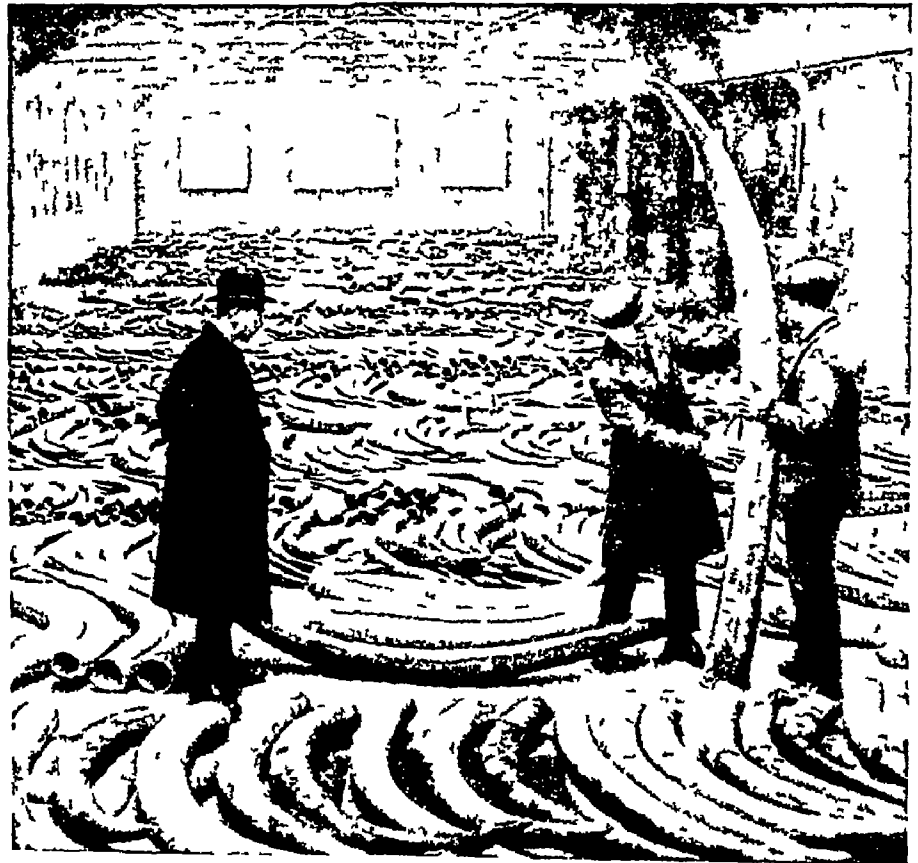
IVAN IV, during his reign from 1533 to 1584, earned the title of the "Terrible" by the insane cruelty he manifested at times. Once in a fit of anger he killed his own son. But Ivan IV, like Ivan the Great, was also a man of great energy. He extended his dominions south to Astrakhan on the Caspian Sea and north to the White Sea, and on the east he added Siberia. In 1547 he formally took the title of Tsar (Caesar), and laid the foundation of the autocratic government under which Russia was ruled for nearly four centuries.

Ivory. Imagine a parade of elephants 150 miles long—an elephant army of 40,000 filing past you in close order for nearly six days and nights! That is the number of elephants that must die every year—including those dying a natural death and the 20 per cent or so slain by hunters—to supply the 1,000 tons of ivory imported from Africa and Asia annually by London

and Antwerp alone, the chief ivory markets. True ivory is obtained only from the tusks of the elephant, generally the male. The tusks grow during the animal's entire life, usually attaining a length of several feet and a weight of from 150 to 200 lb or more a pair. The tusks of the Indian elephant are inferior in quality and size, while the female Indian elephant seldom has any tusks at all.

The ivory used for commercial purposes is also obtained from the teeth of the hippopotamus and wild boar, and even from the fossil remains of prehistoric animals, such as the mammoth, which are still found in the far north of Asia and America. Among marine creatures whose teeth or tusks yield ivory are the walrus, narwhal, and sperm-whale. But all this ivory is inferior to elephant ivory.

From ivory are made billiard-balls, piano-keys, combs, brush-ware, toilet articles, handles for knives, umbrellas, and doors, napkin-rings, paper cutters, special book-covers, statuettes, crucifixes, chessmen, etc., besides a vast variety of objets d'art. It is very elastic and flexible so that riding-whips have actually been cut in one piece from a single long tusk. It has a peculiar marking, a cross-section showing many lines of different colours running in



IVORY TUSKS IN A LONDON WAREHOUSE

In this warehouse at London Docks £200,000 worth of ivory is handled every year. A large tusk, such as the buyer in this photograph is selecting, may weigh as much as 200 pounds. If the ivory is of good quality, this tusk alone might be worth as much as £100.

circular arcs, which resemble the lines on the case of a old-fashioned watch By this means it is distinguished from imitations Ivory is classified as hard and soft, the former having a more glassy and transparent appearance and being more difficult to cut with the saw Hard ivory comes mostly from West Africa Soft ivory contains more moisture than the hard variety, and is able to stand variable conditions better without cracking

So valuable is ivory that no part of it is wasted Sacks full of cuttings and shavings are sold to be used for inlay work Even the dust is used for polishing and, when suitably treated, for the preparation of Indian ink The most valuable ivory—that of the African elephant—is required for billiard-balls, three balls of best quality usually being obtained from one tooth, small tusks are therefore used for this trade Ivory for piano-keys, the other most important use, is of the soft variety

The use of ivory can be traced to prehistoric times We read that King Solomon "made a great throne of ivory" There still exist examples of inland Egyptian ivory, and in the British Museum are many Assyrian ivory carvings made in Nineveh nearly 1,000 years before Christ In ancient Greece ivory was used for carvings, sculpture, and various objects of luxury The sculptures in ivory of the Gothic art of the 13th and 14th centuries are distinguished for their beauty, much of this work is done in walrus ivory, which is now less popular Walrus ivory, too, is the type used for the fine oriental sword handles Ivory mirror-cases, caskets for jewelry or toilet purposes, and other articles used to be carved with scenes from real life or illustrations from the romances, which set forth vividly the dress and customs of the times they represented

Vegetable ivory is a material resembling ivory, obtained principally from a genus of palm (*Phytelephas*), native to tropical South America Other palms (*Attalea*) from Central America also supply a certain amount The fruit, quite as large as a man's head, contains

numerous "nuts" or seeds, called corozo or tagua nuts, which, when ripe, are so hard that they make a valuable substitute for ivory

These hard nuts are usually about the size of a large plum They are much used for buttons, umbrella handles, and similar purposes There are also various artificial compounds which resemble ivory, such as celluloid and xylonite "Bonzoline" and other substitutes for ivory are now extensively used for making billiard-balls

Ivy. This is surely one of the best known of all our plants, with its creeping, climbing stems, rich dark-green leathery leaves, and unpleasant smell To us it is just plain ivy,

but it is really only one of about 50 species growing in the Northern Hemisphere, which botanists call by this name They climb by means of sucker-like disks which attach themselves to walls and trees or by means of tendrils The leaves of the English ivy are evergreen, those that die off turning yellow The small greenish flowers are succeeded by smooth black or yellow berries Contrary to common belief, ivy does not ordinarily injure its means of support, for it is a climber and not a parasite But it worms its way into the interstices of masonry, forcing the blocks apart and bringing other evils in its wake Then, when the ivy bunches round the top, and the wind tears

it off, down come the stones The same happens when the branches of a tree have to carry more ivy than they can bear

The ivy has always been a symbol of the clinging love of woman The altar of Hymen, the Greek god of marriage, whose blessing was invoked at every wedding, was kept green with ivy When Isolde, in the old Irish legend of Tristan and Isolde, immortalized in Wagner's opera, died lamenting the death of Tristan, King Mark, in his anger, buried them apart, but an ivy growing from the breast of Tristan met another growing from the grave of Isolde, and the two vines, entwining, convinced the king that the union of the lovers was pure and undying, and caused him to repent of his anger and bury them together



IVY, A TENACIOUS CLIMBER

The leaves of the ivy alone are enough to enable us to identify it, and here you see some typical ones, more or less five-lobed, dark in colour with paler veins. This specimen is climbing up a wooden fence, and you can see in the lower part of the photograph the small, whitish rootlets with which it maintains its grip on its support.



LIKE C and G, and U and V, the letters I and J were originally forms of the same letter. The vowel sound *i* and the consonant sound *j* were both represented by I until about the 15th century. Then some of the monks who worked on the beautiful illuminated manuscripts of that time used to lengthen the letter I and curve it toward the left when it began a word thus making of it an ornamental initial. Gradually this form came to be used entirely to represent the consonant sound while the old form was retained for the vowel sound. This consonant sound was originally like our *y*. Thus *Julius* in Latin was pronounced as though it were spelt *Iulius*. The sound we give it in English *ch* like our soft *g*, came to us from the Old French. In modern French it is pronounced with a still softer sound like *zh*. In German and some other languages it is still pronounced *y* and we ourselves give it this sound in the word *hallelujah*.

Jackal. Eastern Europe, southern Asia, and northern Africa are the home of the jackal (*Canis aureus*), a dog like animal smaller than a wolf and of less savage habits. It has a pointed muzzle, and a bushy tail about one third the length of the body. The common jackal of southern Asia is the best known. It is greyish yellow in colour, darker above, and lighter on the underside. In Africa, slightly different species occur, and there are also types peculiar to India.

During the day the jackals remain concealed in burrows, caves and jungles, coming out at night to hunt, usually in large packs. They utter a piercing unearthly cry, and the howling of a pack at night makes an appalling chorus, familiar in Oriental villages. They feed on smaller mammals, poultry, and, when living food is unobtainable, on carrion over which they quarrel with the vultures. They dog the steps of wounded animals, as well as larger carnivores, whose unfinished kills they devour.



JACKAL, A WILD DOG W. S. HERRIDGE

Whether the modern jackal is an ancestor of our dogs is a moot point but you can see here how very dog like he is in general appearance. In colour this beast is a greyish- or yellowish brown, thus harmonizing well with the desert country in which he lives.

When running in packs they attack sheep and antelopes. They are easily tamed and probably represent one of the breeds from which the domestic dog is descended. Jackal hunting with foxhounds is a popular sport in India, as these animals are cunning and fight gamely.

Jackdaw. Whether you live in the town or the country you will know this merry, mischievous member of the bird community. He is a fairly large bird

—though not so big as his cousin, the rook—black for the most part with grey on the neck, so that the black on the head looks like a little cap. In towns the “daw,” as he is often called, builds in chimneys, as well as in ruins and churches, bell-fries and similar places, while out in the country hollow trees, cliffs, and even rabbit holes are used as sites for the nest,



M. H. CRAWFORD

PERKY JACKDAW

This member of the rook family is traditionally pert, and the specimen you see above has a naughty look in its bright eye.

which is a large accumulation of sticks, etc. The eggs are pale bluish, with black spots.

The jackdaw (*Corvus monedula*) is a useful bird, too, for it spends most of its time, except the breeding season, wandering over the fields with the rooks, picking up harmful insects and slugs. And you may often see a “daw” sitting on the back of a sheep, not as some ignorant rustics think, waiting to peck its eyes out, but actually ridding it of its parasites. At the same time, the jackdaw's reputation for cunning and mischief is not without foundation, and although the famous “Jackdaw of Rheims” in the “Ingoldsby Legends,” was perhaps an exception, there is no doubt that they are great birds for pilfering and carrying off objects of all sorts. They can be easily tamed, too, and make amusing if somewhat undependable pets. You can usually tell a jackdaw on the wing by the fact that it is smaller than the rook, and by its cheerful call, “tchack, tchack,” the origin of its name.

The Jackdaw of Rheims

"The Devil must be
in that little Jackdaw"
That was what all the

abbots, priests, and friars used to say about the pet jackdaw of the Cardinal Lord Archbishop of Rheims. For a cheekier bird no one ever saw, he was everyone's friend, and the special favourite of the Archbishop himself.

One day, at the end of a feast, six little singing boys came in as usual, carrying water, soap and bowl for the Cardinal Lord Archbishop to wash his hands. The Archbishop put his ring down beside his plate and, without anyone noticing it, the jackdaw flew away with the ring in his beak. There followed a great search, but the ring was nowhere to be seen. Then the Cardinal rose and "solemnly cursed that rascally thief, whoever he might be."

He cursed him at board, he cursed him in bed,
From the sole of his foot to the crown of his head,
He cursed him in sleeping, that every night
He should dream of the devil, and wake in a fright,
He cursed him in eating, he cursed him in drinking,
He cursed him in coughing, in sneezing, in winking,
He cursed him in sitting, in standing, in living,
He cursed him in walking, in riding, in flying,
He cursed him in living, he cursed him in dying!—
Never was heard such a terrible curse!

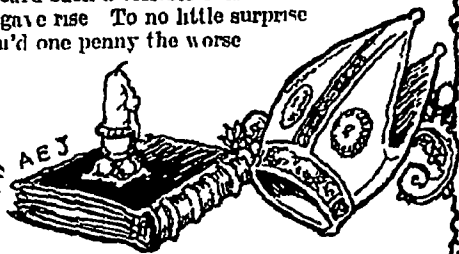
But what gave rise To no little surprise
Nobody seem'd one penny the worse

All night the search went on. At dawn, the jackdaw, with his feathers bedraggled, his head bald, his eyes half-blind, his legs limping and his claws crumpled, came creeping back. At once everyone shouted "that's him!" and all the abbots, priests, and friars followed, as he limped slowly to his nest

in the belfry. And there, lying amidst the sticks and straw, they saw the ring!

Then the Cardinal Lord Archbishop took off the terrible curse, so pleased was he at finding his ring, and straightway the jackdaw grew fat and sleek again. His feathers grew thick and shiny, and soon he was a finer bird than ever before. But he never again stole a single thing, instead, he became the most devout bird ever known, attending all the services (and "cawing" to wake up anyone who dozed off during the sermon).

In fact, so pious was he that, when at last he died, the Conclave made him a saint, and "canonized him by the name of Jim Crow."—Retold from Richard Harris Barham's "Ingoldsby Legends"



Jackson, THOMAS JONATHAN ("STONE WALL") (1824-63) In the whole history of the American Civil War no figure stands out with more picturesque vividness than that of "Stonewall" Jackson.

His strength of will was probably the result of his sturdy Scottish-Irish descent, and of his fight with adverse circumstances. Left a penniless orphan at an early age, he learned to depend upon himself and was educated by his own efforts. After attending a small country school in Virginia he decided to enter the army. He set out for Washington, travelling part of the way on foot, and when he arrived in that city he presented himself before the Secretary of War, and asked for an appointment to the Military Academy.

The secretary was so impressed by the boy's determination that he immediately gave him the appointment. After his graduation in 1846 he served in the Mexican War and won such distinction that in seven months he was promoted to the rank of major. After the close of that war he became a teacher in the Virginia Military Institute, and though he was not a success in the class room, he left an indelible impression upon the negroes of the community, for whom he established a Sunday school and to whom he was unfailingly kind.

In 1861, when the quarrel between the North and the South came to a crisis, he threw in his fortunes with his own people. He wished to see the Union preserved, but he did not believe that the North should force the South to remain a party to a compact which had become hateful. At the battle of Bull Run, when some of the Confederates were thrown into confusion, one of their generals called to the men: "There stands Jackson like a stone wall, rally behind the Virginians." The cry was taken up by the soldiers, and "Stonewall" Jackson was the name by which he was known ever after.

In 1862 he won victory after victory as general of the Confederate forces, but in May, 1863, after winning the battle of Chancellorsville,

he and his escort were mistaken in the dusk by his own outposts for a detachment of Federal cavalry. They were fired upon, and Jackson fell wounded. His right arm had to be amputated, and then pneumonia set in. He died on May 10. The loss of this brilliant general more than offset the Confederate gain in their victory.

While Jackson is remembered as a great general, it is especially as an earnest and upright man that he is admired. On the march he always carried with him his Bible and Napoleon's "Maxims of War." To the study of the latter he owed his success as a general, to the study of the former his greatness as a man. He interpreted literally the injunction to pray without ceasing, and even on the battle-field his lips were often seen moving in prayer.

Jacobins. This famous organization of French Revolution days was started modestly at Versailles in 1789. It took up its quarters in an old disused monastery of the Jacobin monks, and received its popular name from this meeting-place.

It then organized an extensive network of branches throughout the country to assist in preserving and defending the work of the Revolution. Gradually it became more and more powerful, opening its membership and galleries to the radical groups in Paris.

The more conservative members drew away from it or were expelled and formed other clubs. The flight of the king turned its whole influence against monarchy and in favour of a republic. The leadership passed to men like Robespierre and Danton, until finally the word "Jacobin" came to mean a person of extreme revolutionary sentiments, much as the term "Bolshevik" was applied to Russians after the Revolution.

The Jacobin leaders at first opposed war with surrounding countries, then threw themselves into its prosecution and the propaganda that went with it. They confidently expected to catch the king and queen in intrigues with the Austrians and Prussians, and succeeded. At the end of 1792 they engaged with the Girondists in



'STONEWALL' JACKSON

Thomas Jonathan Jackson was one of the heroes of the American Civil War. He gained his nickname of 'Stonewall' at the battle of Bull Run when he stood like a stone wall and rallied the men of the Confederate army. After the painting by East.

a bitter struggle over the fate of the king, and the execution of Louis XVI was the result of the shrewder political game of the Jacobins

Their meetings now became, until the fall of Robespierre (July, 1794), more important than the discussions of the Convention itself. The club was closed in November, 1794, but its membership both within and without Paris was influential in later events.

Jacobites. The chief interest felt today in the Jacobite party arises from the fact that the devotion of the Highlanders to the Stuart or Jacobite cause has added many beautiful songs to the minstrelsy of Scotland.

The name Jacobite was given to the adherents of James II of England and his heirs. James, having roused almost the whole of England

against him by his ill-advised efforts to re-establish the Roman Catholic religion in England, fled the country after the landing on these shores of William of Orange in 1688. James made an effort to regain the throne of England by landing in Ireland in 1689, but the defeat inflicted on him at the battle of the Boyne in the following year compelled him to escape again to France.

James Edward Francis (1688-1766), son of James II and his second wife, Mary of Modena, known as the Old Pretender, attempted a rising in England and Scotland in 1715. His followers were defeated, and "James III," who had landed in Scotland, returned to France.

His son, Charles Edward Stuart ("Bonnie Prince Charlie", 1720-1788) made another and final effort to restore the Stuarts. An army of

Highlanders flocked to his standard in Scotland, but they were defeated at Culloden in 1746, and this finally extinguished the hopes of the Jacobites. Charles Edward was enabled to escape because of the devotion of some of his followers, notably Flora MacDonald (q.v.).

In St. Peter's, Rome, is a monument by Canova, put up by King George IV, to the memory of "James III, Charles III, and Henry IX"—the Old Pretender, Young Pretender, and the latter's brother Henry, a Cardinal of the Roman Catholic Church, respectively. On the latter's death in 1807 the Stuarts' claims passed to a distant branch of the family. In the opinion of present-day Jacobites the man who is legitimately, by right of descent, King of England is Prince Rupprecht of Bavaria (born 1869), son of the last King of Bavaria and a leader of the German armies during the World War.

Jaguar. (Pron jag'-ū-ar) This formidable cat, *Felis onca*, is the tiger of the New World, the third most powerful of the entire cat tribe. The head is large, the legs massive, while the length may be 4 feet, without including the tail. There is much variation in the colour, but in general the animal is yellowish-brown with black



LEADER OF THE LAST JACOBITE RISING

The landing of Charles Edward, the "Young Pretender," at Moidart on July 2, 1745, marked the beginning of the last real attempt to restore the Stuarts. Charles Edward's handsome appearance gained for him the designation of "Bonnie Prince Charlie." Here we see the Prince with two of his followers at Edinburgh before the march south began.

Painting by John Pettie R.A.

STEALTHY PROWLERS OF THE AMAZON FORESTS





BABY JAGUAR

JAGUARS hardly ever breed in captivity, and even when young are born they seldom live long in the cage. This lively youngster, however, christened Corona, seems to be as well as one could wish when photographed at the London Zoo for the first time, at the age of two months. But he had a twin which died at birth, and other jaguars born at the Zoo have met the same fate. Already, you see, this baby is giving some indication of the fierce and unruly nature of his kind, for jaguars are notoriously "difficult" animals.

For

FEROCIOUS YAWN

WHEN the jaguar yawns, you see the full array of his teeth, as fine a set as any one could wish to possess. This is one of two jaguars which were purchased from the Frankfurt Zoo and brought to London to replace casualties. Of all the "great cats," jaguars are the most difficult to keep in captivity, and it is seldom that one sees so fine a specimen as this anywhere but in its native haunts.



markings, each of which takes the form of a rough ring or rectangle with a small spot in the centre. This distinguishes the jaguar from the leopard, which has plain spots.

The jaguar inhabits all South America, except Patagonia, and is found as far north as Texas in the U.S.A. It abounds in the forests and jungles, feeding on animals of any size and being easily capable of killing a horse.

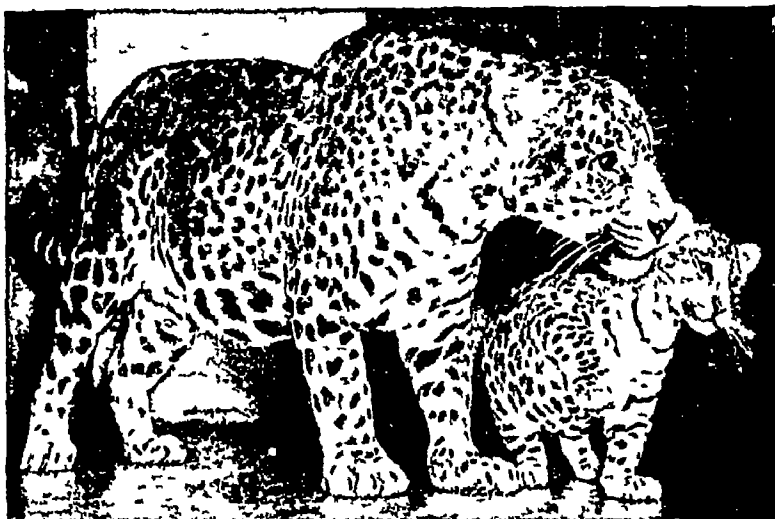
Jam. The idea underlying jam making is to boil the fruit with sugar until the point is reached when the compound will "jell," or set, when cool. Such sweet fruits as strawberries require about $\frac{3}{4}$ lb of sugar to 1 lb of fruit. Most

other fruits require the sugar and the fruit to be in equal quantities. The boiling should be done in a wide pan of brass or aluminum, and should continue briskly for 20 to 60 minutes.

The housewife who is making jam tries it out by pouring a teaspoonful on a saucer and placing it in a draught. If it sets, the jam is ready. If it does not, she boils it longer. When ready the jam is poured into jars while hot, and after it has set and cooled it is covered up with oiled paper and paper parchment, the latter tied tightly over the mouth of the jar.

Marmalade is really jam made from oranges and lemons, the shredded peel of which is added to the preserve during the boiling process. Jellies are made by using only the juice of the fruit, the pulp being strained out.

Jamaica. With her dreamy palm-fringed coves and cloud-capped mountains rising out of the turquoise waters of the Caribbean Sea, Jamaica today, as in the days when Columbus exclaimed over its beauty, is a fairy garden blooming in perpetual summer.



MOTHER JAGUAR AND HER KITTEN

Loz 1 photos

It is extremely difficult to rear jaguars in captivity, and none at the London Zoo has ever lived long. This one, however, born in 1937, seems strong enough, and is well protected by its mother. You can see in both mother and baby the ring-like arrangement of the spots which distinguishes this beast from the leopard.

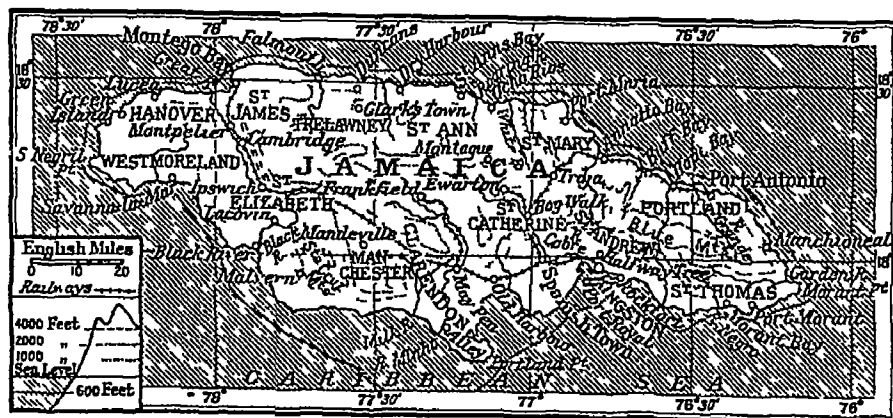
But Jamaica (whose Indian name *Xaymaca* means "island of fountains") is not merely a tourist wonderland of fields flaming with orchids, iris, passion-flowers, poppies, and wild pansies, of sparkling streams and jungle lands of palms, bamboos, and giant ferns, where cuckoos, humming-birds, parrots, and many coloured butterflies endlessly flutter.

It is a land of rich commercial resources as well, with its luxuriant lowland plantations, its gleaming gold and emerald fruit trees, and its weird dusky mountain forests of moss-hung logwood, satinwood, mahogany, rosewood, and ebony. Jamaica exports chiefly bananas, coconuts, logwood (used for dyeing), logwood extract, sugar, coffee, rum, cocoa, allspice or Jamaica pepper (the berry of an evergreen tree), and her famous Jamaica ginger.

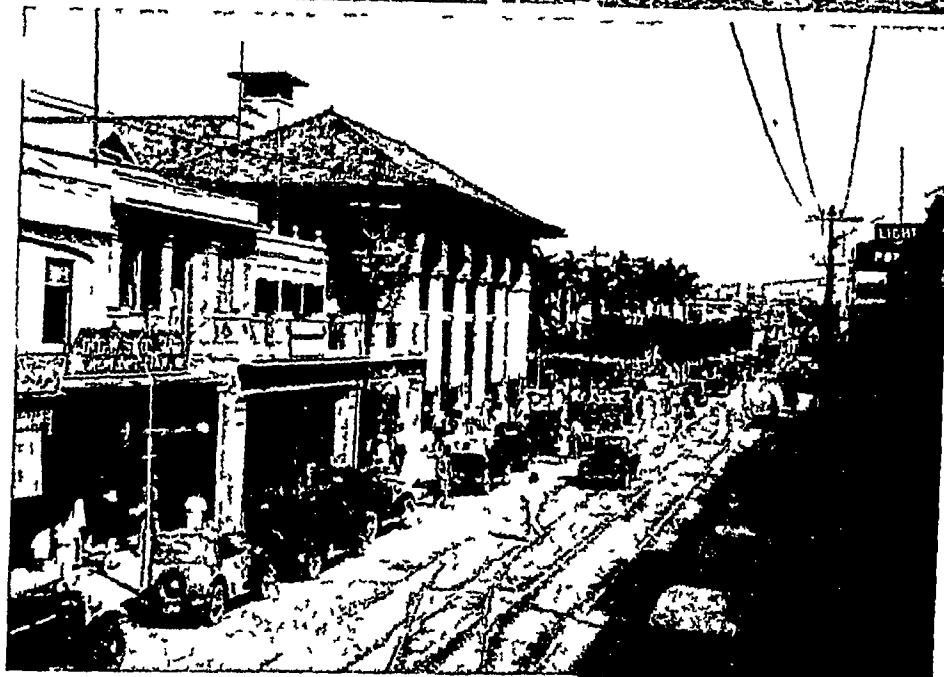
Although this largest and most important of the British West Indies is singularly free from venomous snakes and dangerous animals (for only a few wild pigs and an occasional alligator are found here), it has suffered severely from

earthquakes and hurricanes. In 1907 an earthquake destroyed most of Kingston, its capital, and killed over 600 people, and a disastrous cyclone ravaged the western port of the island in 1912.

Jamaica lies about 90 miles south of Cuba on the main ship route between the Panama Canal



HILLS AND VALLEYS OF THE ISLAND OF JAMAICA



SCENES IN BRITAIN'S COLONY OF JAMAICA

The lower photograph shows King Street, the principal thoroughfare of Kingston, the capital of Jamaica, a town renowned for the beauty of its setting. The street seller in the top left-hand picture is typical of the natives of this island. The top right-hand picture shows how the bananas are picked while they are still green and stacked in great heaps before transport.

Photos Central Art Library Elders & Fyffes Ltd

and Europe and the Atlantic states of America. It is 144 miles long, 40 miles wide, with an area of 4,450 square miles, and has many good harbours, of which Kingston, the chief commercial port (population, 62,000), is the best. Other towns are Spanish Town, Port Antonio, and Montego Bay.

It was discovered by Columbus on his second voyage, in 1494, and 15 years later it was settled by the Spaniards. In 1655 it was conquered by an expedition sent out by Cromwell, and has since become an English colony.

In the early days the island was a favourite haunt of pirates. During the 18th century more than 600,000 negroes were imported to work on the plantations as slaves, and many terrible insurrections took place. Slavery was finally abolished and the slaves were liberated only in 1834.

The inhabitants now are about 77 per cent negroes, 20 per cent half-castes, less than 2 per cent whites, and the rest East Indian coolies, imported as plantation labourers, and Chinese. The government is in the hands of a Governor, a

Privy Council, and a partially elected Legislative Council. Population, about 1,139,000. Attached to Jamaica as dependencies are Turks and Caicos Islands, Cayman Islands and certain smaller "Cays" (keys) of the West Indies.

James. **KINGS OF ENGLAND** Only two rulers of England have borne the name of James. The hatred which was felt for the second of these, because of his attempt to rule despotically and restore the Catholic religion, and the existence of the Jacobite "Pretenders," are probably the reasons for its disuse as a royal name.

JAMES

JAMES I, who was king of England from 1603 to 1625, was already King James VI of Scotland when he came to the English throne as the first of the Stuart line and the first Sovereign of Great Britain (though the two kingdoms were not united until a hundred years later). He was the son of the unfortunate Mary Queen of Scots, and her second husband, the dissolute James Stuart, Lord Darnley. Born in Edinburgh Castle in 1566, he became king of Scotland the following year when his mother was forced to abdicate. During his minority he was a prize to be fought for by rival lords who claimed the regency, and by contending French and English factions. In 1582 he was seized by the Earl of Gowrie and the Protestant party and held captive for a year. Upon his escape he began to govern in reality.

As a boy the young king was sickly, and he never outgrew a weakness of the legs which made it impossible for him to stand without support until he was seven. He became a bold rider, although for many years he found it necessary to be tied in the saddle. He was well educated, especially in theology, although born the son of a Catholic mother, he was a staunch Protestant. His large head and rickety legs gave him an ungainly appearance, and he had little of the dignity that befits a king. A foreigner at his court once wrote "He speaks, eats, dresses and plays like a boor."

When James succeeded to the English throne in 1603, on the death of Queen Elizabeth—his cousin "twice removed"—he was a man of 37, and prided himself on what he called his "king craft." In reality he so lacked political discretion that a French statesman once characterized him as "the wisest fool in Christendom."

Nearly everything that James did displeased some part of the English people. He aroused their jealousy by a vain attempt to bring about a closer union of his two kingdoms of England and Scotland. He alienated both the Puritans

and the Catholics, each of whom had expected concessions from him. Some of the Catholics engaged in the Gunpowder Plot, engineered by the notorious Guy Fawkes, to blow up Parliament and the king and bring in a Catholic ruler. Only one of his acts pleased the Puritans, namely, the new translation of the Bible, which forms the "Authorized Version."

James I also quarrelled with Parliament over taxation and political matters. He believed in the "divine right of kings"—that is, that they receive their powers from God, and are responsible to Him alone, and not to their subjects. He took the position that Parliament owed all

its powers and privileges to the graciousness of the king, while Parliament claimed that these were the "birthright and inheritance of the subjects of England."

He quarrelled with it, too, over foreign affairs. He wanted as an ally the Catholic country of Spain and to marry his son Charles to a Spanish princess. Parliament wanted to fight Spain at sea, and thus aid the German Protestants in the Thirty Years' War. Not until James's plans for a Spanish alliance failed and he decided to make war upon that country, did he and his Parliament agree. The year after the war had begun James I died, relinquishing to his son Charles I the problems that he himself had been unable to solve.

JAMES II, who reigned from 1685 to 1689, was a grandson of James I. His ideas of the "divine right of kings" were the same as those of his grandfather and his father, Charles I.

Fortified by the example of Louis XIV in France he attempted obstinately to carry out his ideas in spite of the fact that his father had been beheaded for this by Parliament. It has been said of James II that he alienated "not only the classes which had fought *against* his father, but also those that had fought *for* his father."

When James II came to the throne the great majority of the people welcomed him, and fought



JAMES I IN HIS ROBES

This portrait of James I, the king who insisted that he ruled by "divine right," was painted by Van Somer about 1620. Even in these magnificent robes he has the ungainly appearance which visitors to his court always noticed. Hampton Court Palace, photo Mansell by gracious permission of His Majesty the King.

JAMES

for him against a rebellion led by the Duke of Monmouth. But the cruelty shown by Judge Jeffreys and others to the followers of Monmouth at their trial—called the “Bloody Assize”—turned many against the king.

Then James angered the nation by trying to restore Catholicism as the religion of England. When he came to the throne he had promised to maintain the Church “as by law established.” The people took this to mean the Established Church of England (Episcopal), and rejoiced that they had “the word of a king, and of a king who was no worse than his word.”

But they soon learned that James put a different meaning on his word, for he did not consider the Reformation statutes to be valid. He set aside or “dispensed” with the laws against Catholics and Dissenters. Seven bishops protested against reading one of his dispensing proclamations, and James sent them for trial. He appointed many Catholics to office, and even named some as bishops in the Church of England. If some of his acts indicated a toleration that was in advance of his age, they were merely to aid his fellow Catholics.

At first there was no organized opposition. Waiting seemed wiser, for James was 52 years old when he came to the throne, and his only children, Mary and Anne, by his first wife, were

both Protestants. But in 1688 a son was born to him by his second wife, who would be the heir to the throne and would be educated as a Catholic and so would prove another Catholic king. Protestant nobles unjustly claimed that the child was not really the son of James and the queen, but was smuggled into the palace.

They therefore invited James's daughter Mary and her husband, William of Orange, to come from Holland and take the throne of England. When William landed practically everyone, even his daughter Anne, deserted James, and he fled. This was the “glorious revolution of 1688.”

James went to France, where he was cordially received by Louis XIV, who had been furnishing him with money to carry on his fight for absolute power, both civil and religious. The French king now gave James a pension and support in trying to recover his throne. But James was defeated in Ireland at the battle of the Boyne (July 1, 1690) and the French fleet was crushed at La Hogue in 1692.

After these two reverses James realized that the game was up. It was sufficiently clear that he was no longer wanted in England. He therefore abandoned all active attempts to regain the English throne, which by his obstinacy he had forfeited, and resigned himself to a life of exile in France, where he died in 1701.



JAMES II REFUSES MERCY TO MONMOUTH

One of the reasons for the turning of public opinion against James II was the severity with which the Monmouth rebellion was crushed. When the Duke of Monmouth landed at Lyme Regis he had only untrained levies to support him, and when they met the King's troops at Sedgemoor they were utterly defeated. There followed wholesale executions of the rebels, and Monmouth himself was captured and sentenced to death. This picture by John Pettie, R.A., shows the young rebel—he was a son of Charles II—on his knees, with his hands bound behind him, vainly pleading for his life with James II.

Manchester City Art Gallery

The LAND of the RISING SUN

Extent—Length of island chain, north to south, about 2,600 miles. Area of Empire, 260,000 square miles—Japan proper (Honshu, Hokkaido, Kyushu, Shikoku, and adjacent small islands, Kurile, Nansai, and Bonin groups), 148,000 square miles, Korea, Formosa, Japanese Sakhalin, and Pescadores, 113,000 square miles, Kwantung, leased territory on Liaotung Peninsula of Manchuria, 1,400 square miles. South Sea Mandated Territories (the Mariannes, Marshall, Pelew, and Caroline islands). Population of Empire, about 100,000,000, of Japan proper, about 71,252,000.

Physical Features—About 3,000 islands, largely of volcanic formation, with numerous high mountain ranges and more than 200 volcanic peaks, about 50 of which are active. Korea, generally hilly, with several mountain groups. Highest point in Empire, Mt. Morrison, on Formosa (13,020 feet), on the main island, Fujiyama, the 'sacred' mountain (12,395 feet). Climate humid, it varies from tropical in the south to cold in the north.

Products—Rice and other cereals, raw silk, tobacco, tea, sugar, fish, coal, copper, petroleum, silk, cotton, and woollen goods, chemicals, steel, paper, matches, toys, earthenware, lacquer ware, matting, etc.

Principal Cities—Tokyo (capital, over 6,000,000), Osaka (3,000,000), Nagoya, Kyoto (1,000,000), Kobe, Yokohama (over 700,000).

Japan. Of all the remarkable changes that took place in the 19th century, perhaps none was more notable and more unexpected than the transformation of Japan—called by its inhabitants *Nippon*, "The Land of the Rising Sun." In 1850 it was an obscure Asiatic country, which for 200 years had shut itself up tightly from the rest of the world. Foreigners were not allowed to enter the kingdom, and subjects were forbidden to leave it.

Then suddenly came the awakening. In July 1853 Commodore Matthew Perry appeared off the coast with a squadron of ships of the United States Navy, sent to induce Japan to enter into trade relations with the nations of the West. Finally, a treaty of friendship was signed (in Feb. 1854) by which Japan

agreed to open certain ports to American vessels. European countries, which for some time had been seeking to open up Japan, now followed this lead. After a few years of hesitation Japan unlocked the doors of its Empire, and began rapidly to adopt western civilization.

It was in the year 1868 that a political revolution took place by which the Shogun (a sort of viceroy), who for 250 years had borne the

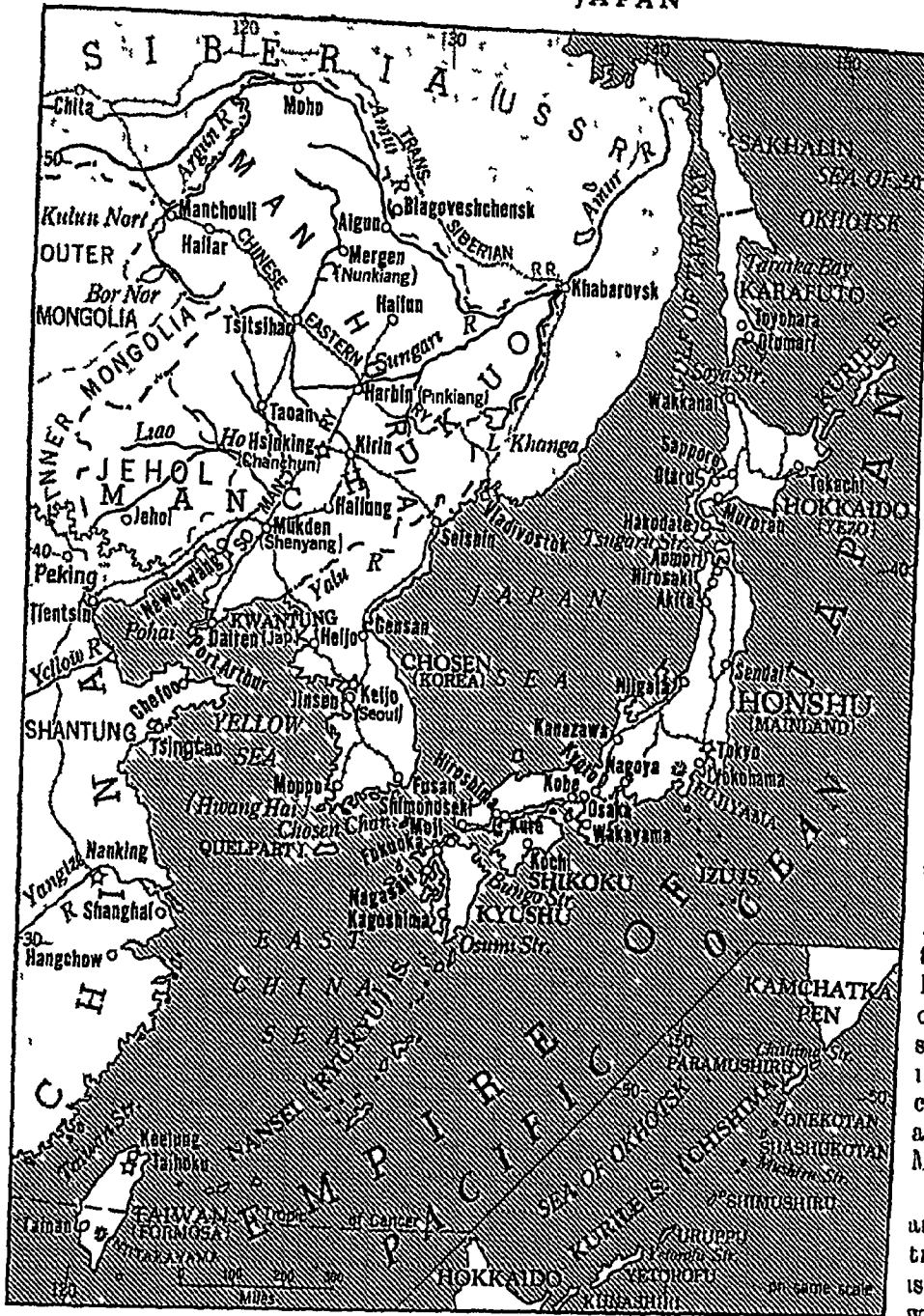
Japanese people are children of Nature and spend much of their lives in the open air. All the cities have beautiful parks and this is a scene in one of them. What could excel in dreamlike beauty this picture with its gnarled pine so characteristic of Japan, and the pretty Japanese maiden with her parasol mirrored on the glassy surface of the water?



actual rule in Japan, was deposed, the power of the Mikado, or Emperor, was restored, and feudalism abolished.

In a little over half a century Japan has evolved from a feudal nation, utterly closed in, to one of the important trading countries of the world. Its ships are now found in every port and carry a large part of the traffic of the Pacific Ocean. Japanese scholars have become

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THE FAR-FLUNG REALM OF THE MIKADO

Here you see how Japan occupies five main islands, and extends over 29 degrees of latitude—2,600 miles. The country is about 1,000 miles longer from north to south than the United States. Most of the 1,600-odd smaller islands under its flag are too tiny to appear on this map, but Korea, the Kurile Islands, and Formosa, which belong to Japan, are shown. You can readily see why the new state of Manchukuo on the mainland is so vitally linked with Japan's destiny.

proficient in modern science and engineering, and a great modern army, navy, and air force have been created. These have demonstrated their strength in successful wars against China, Russia, and Germany, which have more than doubled the territory of the Empire.

As the island kingdom of England is the gateway to Europe, so Japan, the island kingdom of the East, is the gateway to Asia. For a distance of almost 3,000 miles its islands fringe the edge of the continent in three great festoons. The most northern arc consists of the Kurile

Islands—cold, barren, and inhabited chiefly by fishermen. In the centre is the main group, Japan proper, which consists of four large islands—the greatest, Honshu, being about the size of Great Britain. In the south the long chain of the Nansei (Ryukyu) Islands forms an almost continuous link with Formosa, which is the most southern part of the Empire, won as the spoils of the Sino-Japanese War of 1894. In addition, Japan shares with Russia the large island of Sakhalin in the north (her portion being called Karafuto), and less extensive outposts on the Asiatic mainland: Korea, acquired in the Russian War of 1904, is now a part of her Empire, and she has a dominating influence in Manchuria (Manchukuo) and certain parts of Mongolia and China.

Nature in Japan is arresting and beautiful. The narrow islands are crowded with mountains of more than average height, whose soft contours, caused by erosion and volcanic force, are responsible for a landscape that

is as unusual as it is lovely. The beauty of the gnarled and twisted old pines, picturesque maples, and great masses of wild flowers in spring and summer helps to explain the artistic temperament which even the most ignorant Japanese possesses.

Probably in no other part of the world are flowers so greatly appreciated as in Japan. The poorest householder always has a garden, and flowers enter largely into public festivals.

By far the most famous and lovely of Japan's wonders is Fujiyama (12,395 ft high), the sacred

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mountain of the land. A dormant volcano, it has been inactive for more than two centuries. It stands alone in a plain about 70 miles from Tokyo. From earliest ages Japanese poets and painters have made it their theme, and many thousand pilgrims ascend each year the shrine bordered paths which lead to its summit.

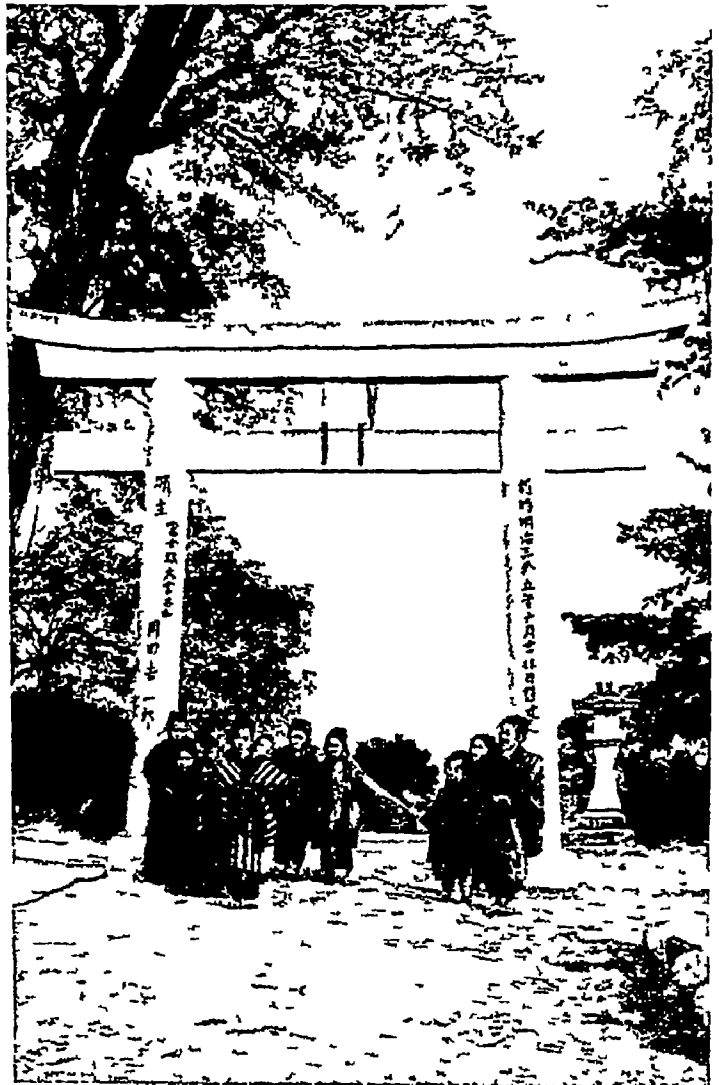
Few scenes from which water is absent find much favour in Japanese eyes. There are many charming waterfalls and lakes in the mountain districts, and streams and bridges are to be seen everywhere. The island studded Inland Sea south of the main island is world-renowned for its lovely scenery, as are also the Pine Islands in north-eastern Japan—800 of all shapes and sizes—each with its crown of twisted pines arising out of the blue waters. Japan's numerous volcanoes furnish hundreds of hot mineral springs, visited continually by crowds of ailing Japanese pilgrims.

Both mountains and streams have their tragic side. Among Japan's mountain ranges are more than 200 volcanic cones, of which no fewer than 50 are known to be active. Japan has an average of four earthquakes a day, not counting the minor vibrations felt only by delicate instruments, and it is said that every Japanese expects to experience at least one serious earthquake during his lifetime. The worst on record is that which destroyed Tokyo and Yokohama in 1923, both cities had to be virtually rebuilt, and 150,000 lives were lost. Equally great harm to life and property is inflicted by the floods, caused by swollen mountain streams and tidal waves. Occasionally, too, the typhoons or hurricanes do considerable damage on land and sea.

Japan has a coast line out of all proportion to its area, and good harbours are to be found nearly everywhere, but especially in the east. Here, consequently, are found most of the large cities—Tokyo, the capital and largest city, and on the same bay its port, Yokohama, which handles more than one-half of Japan's foreign trade. Farther south is Osaka, the nation's industrial centre and second largest city, and Kobe, its port, which is to Osaka what Yokohama is to Tokyo. About 26 miles from Osaka is Kyoto, which for more than 1,000 years was the capital of Japan. It is the Japanese "Mecca," the centre of the Buddhist faith, and its beautiful temples are visited every year by many pilgrims.

The remarkable extent of Japan from north to south affords every variety of climate and a resulting variety of crops, much of the country producing easily two harvests a year. Despite the great mountain ranges, which permit only about one eighth of the land to be cultivated, agriculture has always been Japan's most important industry.

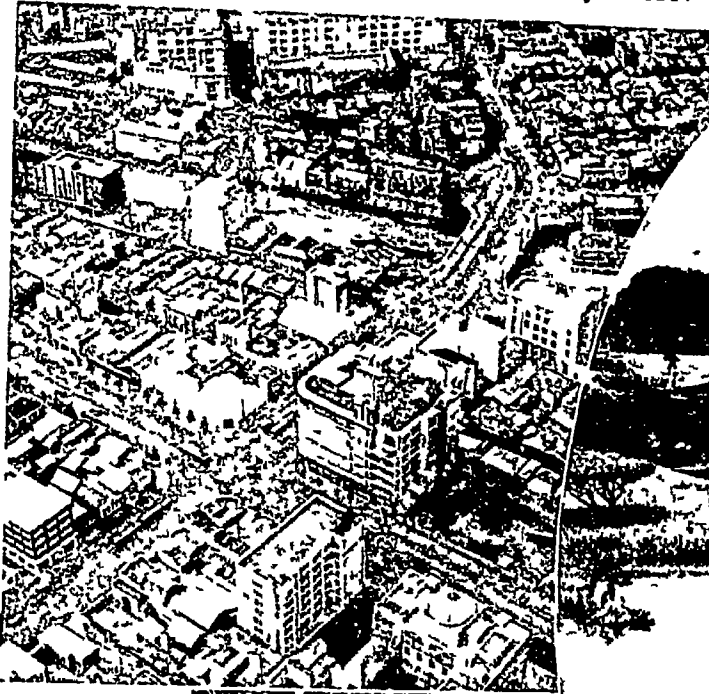
More than half of the arable land grows rice, which forms the staple food of the people. Everywhere in the lowlands are found the little square rice-fields, surrounding small villages of brown thatched cottages of wood and paper, where the farmers live. The people still cling to their ancient methods of cultivation, doing all the work by hand or with crude implements, and women and children, as well as men, are seen in the fields. Labour is cheap, and the great and increasing population of Japan



SACRED GATE TO JAPAN'S HOLY MOUNT

Lofty torii like this one guard every entrance to the sacred ground of Fujiyama. This gate at Omiya is the main starting-point of the ancient route by which thousands of pilgrims annually climb Japan's most sacred peak, which can be seen in the background.

Photo Rev W. Weston



MODERN CITY AND ANCIENT BEAUTY

Though Japan has adopted western civilization, it still cherishes its old customs, its ancient garb, and its inborn love of beauty. At the top is a glimpse of modern Tokyo. The fish kites in the picture below are flown on Boys' Day, or the Feast of Flags (May 5). When the cherry trees blossom, as in the next picture, all Japan takes a holiday, for the Japanese almost worship this tree because of its delicate loveliness. Wherever you go in Japan, you find landscapes artfully arranged, like the one in the oval. Even the stepping-stones have been laid out with care so that they form a gracefully irregular curve.

A Japanese farm seems very quiet to foreigners, because of its lack of animals. The Buddhist religion forbids the use

necessitates an intensive system of agriculture, even the steep hill-sides are terraced fields.

As the country slopes upwards from the alluvial plains the rice-fields disappear. Wheat and barley take their place, or sweet potatoes, "daikon" (a large radish), and egg-plant. These form the food of most of the agricultural class, rice among them is considered a great delicacy, for it is usually sold to the cities or to foreign countries. Much rice of cheaper quality is also imported from other Asiatic countries. Tea is the national drink of the people, and the tea plant is widely cultivated, especially near Kyoto. Tobacco is also raised extensively

of animal food, and, moreover, the native "bamboo grass" is too tough and coarse to make good pasturage. The Japanese, therefore, resort to the sea for a substitute, and Japan has over 2,000,000 people engaged in fishing.

Since the average farm of each family does not exceed three acres, it is only by double crops and home industries that the Japanese peasant can hope to make a living. Various handicrafts in straw and wood are carried on by the farmer and his family, but the chief home industry is silk-worm culture and silk production. Rows of dwarf mulberry trees are often seen forming a hedge around the upland fields, their leaves

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supplying food for the silkworms. Piles of cocoons are set out in the sun to dry, and the cottages hum with the sound of silk-winding. Raw silk is one of the chief exports of Japan, it supplies about 75 per cent of the world consumption.

Bamboo is widely raised, and, next to rice, plays the chief part in Japanese life. Not only is it used for building and furniture, but the tender young sprouts of the plant are cultivated for food. The forest trees of Japan cover nearly 60 per cent of the land, and many valuable products are obtained from them. For instance, lacquer ware, one of Japan's most prized and characteristic products, is made from the resin of the lacquer tree, and much of the world's supply of camphor comes from Japan's camphor trees. The great timber tree, however, is the "Japanese cypress," *Cryptomeria japonica*, one of the finest of all conifers, which is some times seen in gardens in Britain.

The fibres which are obtained from the paper mulberry are used for making "Japanese paper," and many other trees which grow in abundance furnish wood for match-making and for toy making.

But all over the land the old romantic life is passing and is being replaced by the whirr and rush of modern industry. In all sorts of places, amid the low, picturesque bamboo buildings of



'CLERGYMEN' OF JAPAN'S OLDEST RELIGION

These venerable gentlemen are priests of the most ancient religion of Japan, Shintoism. This religion, like our Bible, begins with an account of the creation and peopling of the world, but gives quite a different account of it. In addition to worshipping the powers of Nature, the Shintoists venerate the memories of countless Japanese heroes of ancient times. The Shinto pantheon includes hundreds of deities—gods of trees, rocks, mountains, animals, family ancestors, earth, sea, fire, wind, and even such humble household appurtenances as the well, the bathroom and the saucepan.

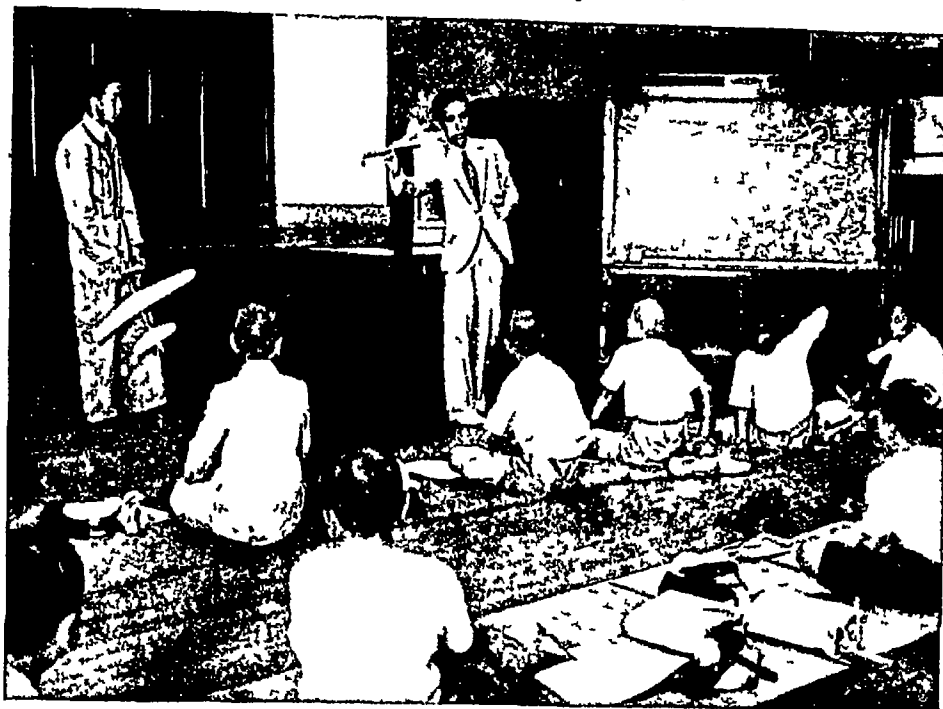
old Japan, you come upon the great factory compounds, surrounded by high board fences, where several hundred people live and work.

This industrial expansion is in part the result of an attempt to make jobs for Japan's rapidly growing population and to raise the standard of living. It has been accompanied by an



MOUNTAIN CLIMBING—JAPANESE FASHION

Mountain-climbing in Japan, as in Europe, is a popular form of sport, but the Japanese ladies prefer to enjoy it at their ease. These ladies of the upper class are returning down a mountain slope borne in their palanquins by sturdy coolies. You can see how the path has been improved in times past by planting shady trees.



YOUNG JAPAN BECOMES 'AIR-MINDED'

Keystone

Japan has shown a keen appreciation of modern inventions and science, and has given her young people every chance to learn all about what the Western peoples have done. In order to inspire in Japanese youths an interest in aeronautics, lectures are given in the special Hall of Aeronautics in Tokyo, free to all who care to attend them. The photograph shows a class of primary school-boys attending such a lecture.

intensive drive to open up foreign markets for the products of the factories. In this drive Japan is aided by the fact that its wealth is controlled by a small class, which can act almost with the swift discipline of an army. It also has an abundance of intelligent, nimble-fingered people willing to work for a pittance. With these advantages Japan has won Great Britain's former place as the world's leading exporter of cotton textiles, and threatens to oust the United States from leadership in rayon (artificial silk) exports. Woollen exports are increasing rapidly. Iron and steel industries are growing. A large export item is a flood of knick-knacks of the sixpenny-store variety and cheap electric light bulbs and other electrical equipment. Other exports are rubber goods and machinery, including cheap motor-cars. These exports nearly balance the imports.

The greatest barrier in the way of Japan's economic progress, however, is its poverty in raw materials at home. This is one reason why Japanese statesmen have worked to get control of the raw materials found in Manchukuo, as well as the coal and iron of North China.

Japan's leading customers for exports are Manchukuo and Kwantung, on the mainland. The United States comes next. British India is third, with cotton goods a large item. About half of Japan's exports go to these regions.

With the adoption of western methods and machinery, the output of Japan's mines has enormously increased. By far the most valu-

able mineral product is coal, the richest fields being in Hokkaido (Yezo) and Kyushu. With the acquisition of certain rights in Manchukuo, Japan has added other rich deposits, so that its annual output is enormous.

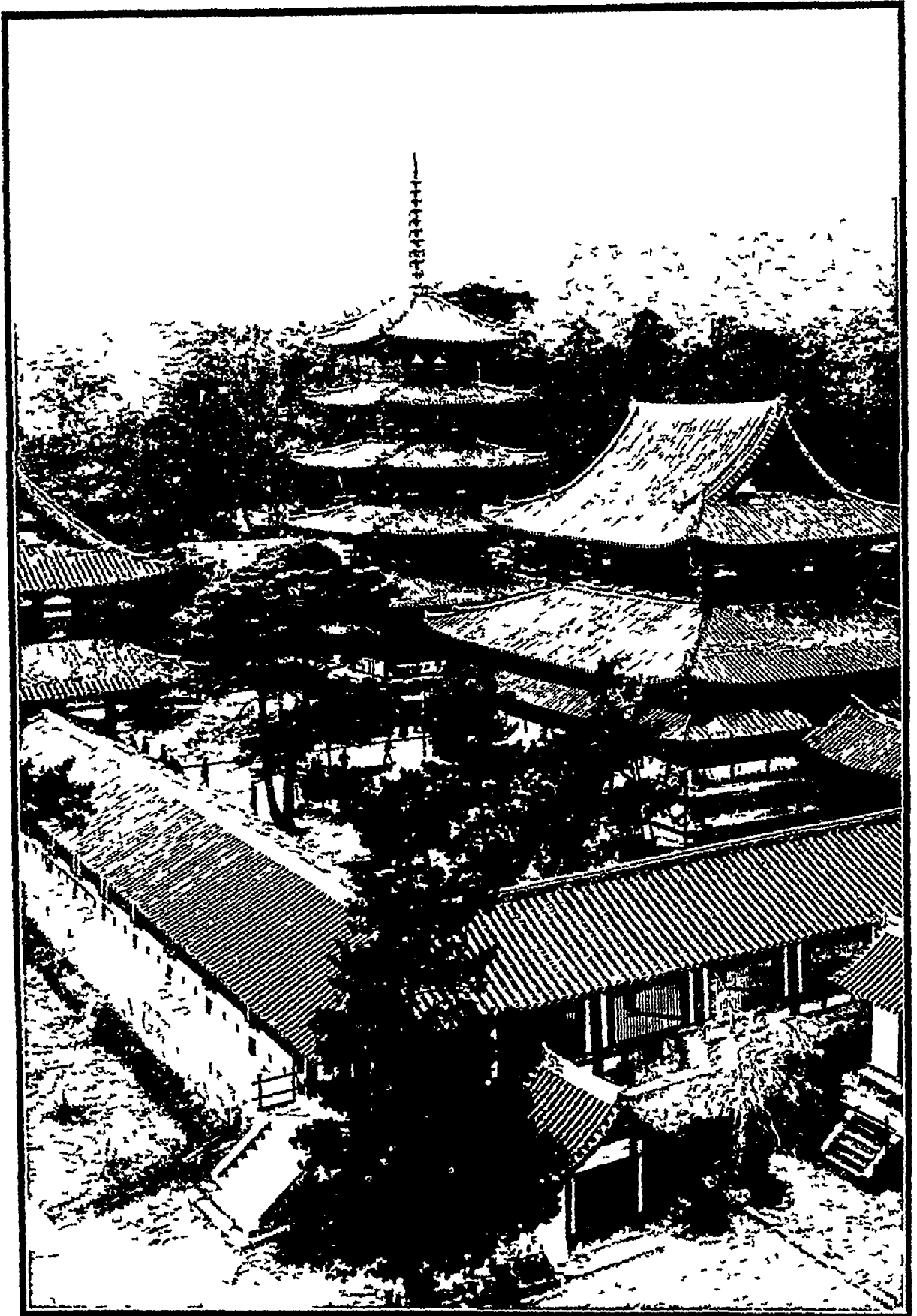
Copper is mined in every district in the country, but Japan now buys more than she sells. Iron is also found, but in quantities wholly insufficient to supply Japanese needs. This urgent demand for iron in part accounts for Japan's move to gain a foothold in China, where there are rich mines of this all-important mineral. Oil-fields

exist in northern Japan, and are increasing in output under modern methods. Sulphur, which has been an important export for centuries, is produced in volcanic regions. Rich deposits of kaolin furnish clay for porcelain, and gold and silver are mined.

That Japan has been able to take a place so speedily among the great commercial nations is due to the national quickness of its people and to their skill in adaptation; they are not inventors. The government early sent large numbers of its young men to study abroad, and it has also dispatched missions to study trade conditions and factory systems all over the world. Modern educational methods, modern machinery and inventions have been adopted wholesale. "Adopt, adapt, adept," may be called the national trade and industrial motto since this awakening of interest in the outside world. Elementary education, modelled on European lines, is compulsory in Japan, and there are five imperial universities.

The original religion of Japan is Shintoism, a combination of nature worship and ancestor worship. The chief deity, the sun-goddess Amaterasu, is looked upon as the ancestress of the imperial family, while numerous lesser gods are associated by tradition with mountains, streams, forests, etc. Buddhism ranks with Shintoism in importance, and among the upper classes Confucianism has many disciples. Christian missions have made considerable progress since the reopening of the land.

CENTRE OF JAPANESE WORSHIP FOR 1,300 YEARS



What are believed to be the oldest wooden structures in the world are included in this famous Horyu-ji temple group near the town of Nara, once capital of Japan. These distinguished examples of Japanese-Buddhist architecture date from the early 7th century. Rising from the centre of the group is the typical five-storeyed pagoda, a design borrowed from China.

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The royal ancestry of the Mikado, as the Japanese emperor is called, is perhaps the most ancient in the world. Japanese tradition fixes the foundation of the dynasty in the year 659 B.C., and 122 rulers of the imperial line are counted since that time, 16 of whom were women. The most important event in early Japanese history was the adoption of Buddhism from Korea in the 6th century B.C.

Although the emperor has always been the nominal ruler in Japan, his power was usurped in the 12th century by a military class whose leader was called the Shogun. The emperor came to be regarded as a divine ruler, who had no part in the practical work of government. A system developed closely resembling the feudalism of medieval Europe, in which the fighting barons and knights (*daimios* and *samurai*) were separated by a wide gulf from the commercial and agricultural classes. These caste lines have not yet all disappeared. There still exists a great group, called the "eta" class, whose members are social outcasts and work only with dead bodies. The two chief religions, Shintoism and Buddhism, forbid such work for their members, so the tanners, butchers, and some other workers of the country are looked down upon, no matter how rich they may be.

Marco Polo, a Venetian who travelled extensively in the East in the 13th century, first brought reports of Japan to Europe, and as

"Cipango" it was one of the objects of Columbus's search. Three Portuguese sailors, blown out of their course from the coast of China, were the first Europeans actually to visit the islands (1542). This was before the age of Japanese seclusion, when foreigners were welcomed to the islands.

The great Jesuit missionary, Saint Francis Xavier, began his labours in Japan in 1549. For some years the Dutch and English had trading posts in Japan, and Japanese sailors traded with Mexico, the Philippines, China,

and India. Then, in 1614, the Shogun ordered all foreign priests to be expelled and all their churches destroyed, on account of political plots. By relentless persecution Christianity was stamped out, Japanese were forbidden to leave the island on penalty of death, and until the middle of the 19th century Japan pursued its policy of isolation from the western world.

The reign of a single emperor, the benevolent Mutsuhito (1867-1912), covers almost all of Japan's marvellous transformation since that time. Coming to the Mikado's throne 13 years

after Perry's treaty, he overthrew the Shogun the next year (1868). In his famous Charter Oath, he urged his subjects to seek knowledge and wisdom in all parts of the world, so that they might help to place the empire upon a firm foundation. Embassies of Japanese statesmen and students set forth to visit every civilized nation. Some of them had learned a little English by careful study of a grammar. They were garbed in the dress of old Japan, in kimonos with plaited overskirts of heavy silk, and they wore their hair in pigtails knotted on top of their heads. In appearance they were men of old Japan, but their minds were alert to receive new ideas.

Those who studied political systems were influenced by the German idea of government, and so drafted a constitution (proclaimed in 1889) on that pattern rather than according to the Anglo

Saxon idea of democracy. They also chose the German army and navy as models. France and Italy gave them ideas of art and architecture, England and the United States their idea of education and industry. With the beginning of constitutional government in 1890 the Era of Enlightenment had indeed begun to dawn.

The changes that stand out as most important since that time relate to the territorial growth of the country. In the war with China in 1894-95 came the first test of Japan's new strength. The Japanese navy, built in the



JAPAN'S 'EMPIRE DAY'

Every year the foundation of the Japanese Empire by the accession of the Emperor Jimmu in 659 B.C. is celebrated in February by the Plum Tree festival. Members of various organizations assemble at different points in the city and march to the Imperial Palace. Here is a contingent of children dressed in the costume of the Samurai, centuries old, taking part in the procession.

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best shipyards of Europe, speedily sank the Chinese fleet, and the Japanese army, drilled and equipped in modern fashion, entirely overwhelmed China's out-of-date forces

Russia, Germany, and France stepped in, however, and forced Japan to accept the island of Formosa as compensation in place of Port Arthur and other places on the mainland which China had agreed to give up. Then Russia took Port Arthur for herself, and Germany followed suit with Kiaochow (Tsingtao). Japan accepted the situation and—waited.

Nine years later Japan settled accounts with Russia in the Russo-Japanese War (1904-1905), in which the fleets and armies of the Giant of the North were thoroughly beaten by pygmy Japan. This victory brought to Japan Korea, half of Sakhalin, together with Russia's rights in Port Arthur, Liaotung and Manchuria.

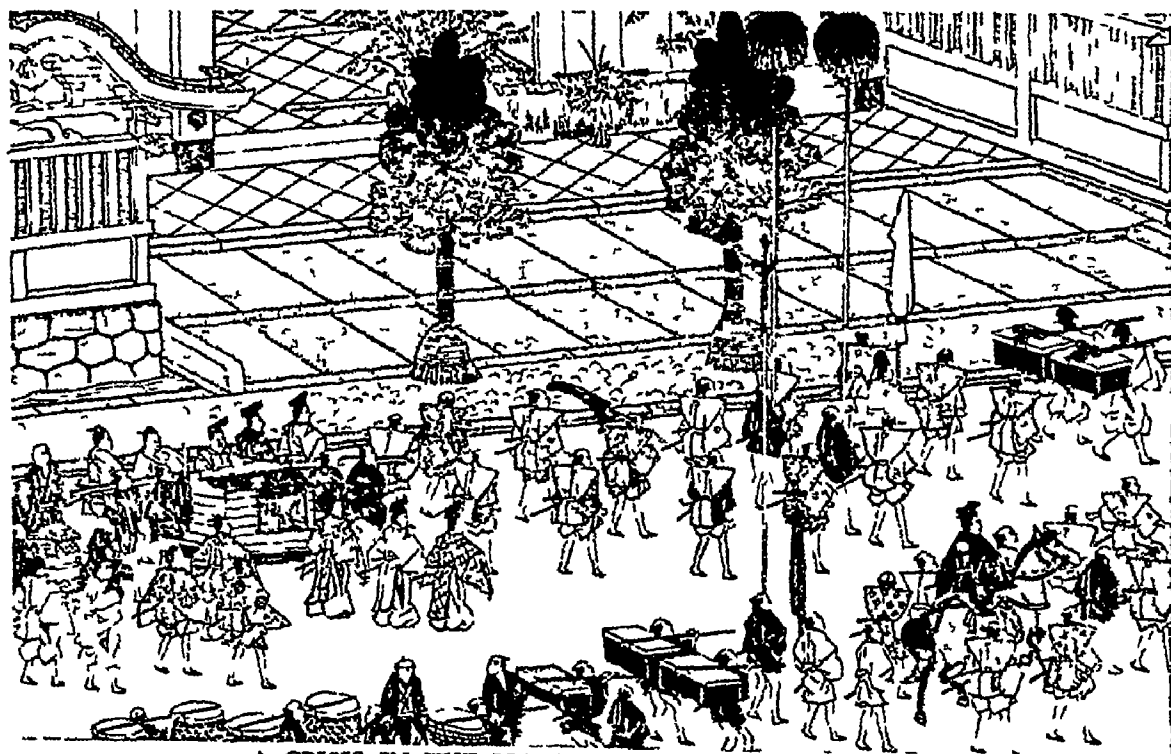
When the World War began in 1914, Japan fulfilled her treaty alliance to Great Britain by at once attacking and capturing the strongly fortified German position in Kiaochow. Here is an interesting fact: the demand she made upon Germany at that time was in the same language that Germany had used 20 years before in forcing Japan to give up Port Arthur!

At the close of the war the Treaty of Versailles left Kiaochow and all the German concessions in the province of Shantung in the hands of Japan. But later Japan withdrew and accepted the

Washington or Nine Power Treaty (1922), guaranteeing the territorial integrity of China. Japan, however, gradually strengthened her interests on the mainland, until in 1932 she declared part of Chinese Manchuria to be an independent state under the name of Manchukuo—though governed by a puppet emperor installed by the Japanese. Meanwhile, the Chinese were boycotting Japanese goods. In retaliation, Japanese troops attacked Chapei and took Shanghai, evacuating it later. After protests by various Powers and by the League of Nations, Japan in 1933 announced her withdrawal from the League.

Despite an internal situation by no means settled—in a brief military rising in 1936 several important statesmen were murdered—the Nationalists, in control of Japan's powerful army, again invaded China in July 1937, and this time made an attempt to bomb into submission various key cities in the heart of the enemy territory. Peking was in Japanese hands after only a month, and Shanghai and Nanking fell shortly after.

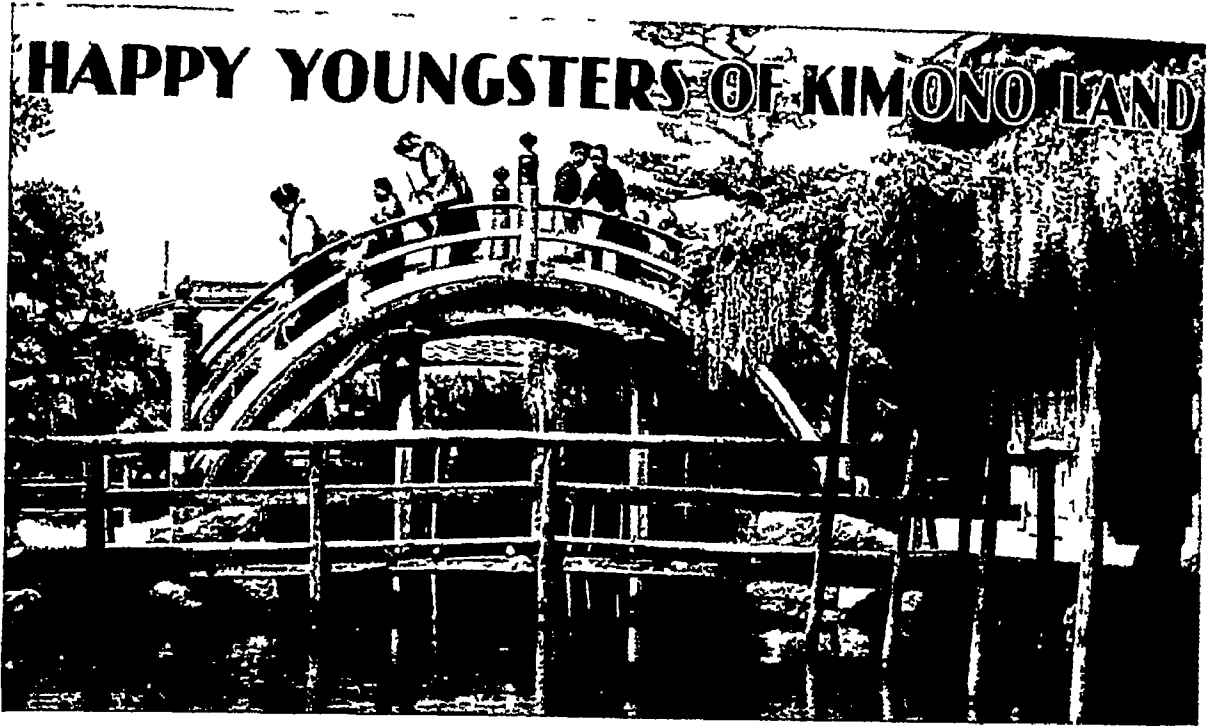
Her invasion of China reached another stage in October 1938, when Canton and Hankow both fell. Incidents at Tientsin, where British subjects were insulted, led to strained relations with Britain and the U.S.A. Japan declared her intention of maintaining strict neutrality in the European war that began in September 1939.



A CRISIS IN THE MODERN AWAKENING OF JAPAN

The rise of Japan to the position of a great power may be dated from 1868, when the Tokugawa Shogunate fell. An interval followed in which it seemed possible that some great clan might attempt to set up a new administrative body. But the Japanese were loyal to the Emperor, and the crisis was solved when the feudatory chiefs surrendered their domains to the throne. The illustration shows the procession of the chiefs as seen by a Japanese artist.

From Official History of the Empire of Japan Chicago Exhibition of 1893



NOW if you would really like to know how the boys and girls in the Sunrise Kingdom live, what kind of clothes they wear, what they have to eat, what they study at school, and what kind of games they play, come for a little visit to the home of a Japanese boy and girl. The boy's name is Taro. That is a name that all Japanese boys like very much, for it is the name of the hero in one of their favourite stories. The little girl's name is Yuki. Her mother and grandmother call her Yuki San, and the servants say "O Yuki San," which means "the Honourable Miss Snow."

It is five o'clock in the morning. The rays of the bright sun have just begun to peep through the cracks in the shutters. *Br-r-r!* Off goes the alarm clock. The sleepy maidservants rub their eyes, dress quickly, and begin sliding back the shutters. Now, a Japanese house is very like a great big box. In the daytime it is like a box with one side off, but at night it is like a box all tightly nailed up. During the day one side of the house is left entirely open to the sunlight and breeze, but the Japanese are not allowed to sleep with their windows open. The police will not let them, for they think that it would invite burglars to enter and rob.

When the shutters have been opened, everyone in the family begins to stir. Really it is no use trying to sleep any longer, with the cook breaking up firewood in the kitchen, and the rickshaw man noisily sweeping up leaves on the garden paths and lawns.

Everyone in Taro's family has been sleeping on the floor, with thick quilts under and over them. The upper covering looks like a big padded overcoat, with its thick flopping sleeves. These sleeves are not to be worn on the arms.

They simply help to tuck in the quilt. Grandmother peeps in at Taro and Yuki and tells them to start getting dressed. Of course, there is a grandmother in this house, because no Japanese home is without one!

After washing their faces in the shining brass bowls set out for them in the bathroom, the children put on their kimonos. Granny helps them. Just think of it, there isn't a button, or a hook and eye, or a pin used in fastening any of their clothes! Taro's kimono is made of dark striped material. The sleeves are rather short and the garment is held together by a black girdle. Taro doesn't need to worry whether he will get holes in his stockings, for stockings are not worn in Japan. He covers his feet with white tabi, something like heavy socks that reach just above the ankle. Each tabi is made with a split toe so that the big toe may be slipped through the leather strap that holds on the straw sandal worn indoors and the wooden clog for street wear.

Yuki San's kimono is much gayer than her brother's. It has a pattern of flowers and birds, and is fastened with a bright red sash. Her sleeves reach to her knees. You'd never guess—unless you saw them turned inside out—what a wonderful substitute for pockets sleeves can make. Yuki San can carry a doll, a book, half-a-dozen paper handkerchiefs, a bag of sweets and whatever else she pleases in her flowing sleeves, and no one is any the wiser.

If anyone offered you what Taro and Yuki eat as a relish for breakfast, you would make a very wry face. Pickled plums, as sour as can be, and dipped in salt besides! Grandmother helps the children with their breakfast, because she doesn't want them to be late for school. They

eat first a bowl of soup called "o miso" It is made of bean curd, and the children think it very good When they have finished their soup, Granny fills their rice bowls, and each child has two helpings Along with the rice they eat some green vegetable and also some pickled radish

They have eaten with chopsticks ever since they were babies, so they find no difficulty in picking up the very last grains at the bottom of their bowls It would be pretty hard for an English child to do this When the rice-bowls are empty, Granny fills them up with tea Taro and Yuki hastily swallow this, and with polite "good byes" to father and mother and many "thank you's" to Granny they set off for school

If Taro and Yuki had lived 25 years ago, instead of today, they would have been obliged to sit on the floor throughout school hours But nowadays many of the boys and girls of the Japanese Empire sit on a bench and have very much the sort of desk every English boy and girl uses Can you guess the reason? The Japanese have found that boys and girls grow taller and much sturdier if they do not sit on the floor with their legs cramped underneath them for hours at a time Young men in the universities who have had our kind of physical training, and who were never obliged to sit on the floor during school days, are several inches taller than their fathers So Japanese physique is now improving

Taro and Yuki have a much harder task learning to read and write than children have in our country Instead of learning 26 letters as an alphabet, they must learn 50 of one kind, 45 of another, and then, over and above all these, they must also commit to memory three or four thousand Chinese characters These characters look like pictures That is what they really were in the first place—pictures drawn to show a meaning For instance, the Chinese character for "man" is a funny two legged picture The one for "house" looks like a box with a roof over it It takes 20 or 30 strokes of the brush to make some of these pictures Can you imagine learning to

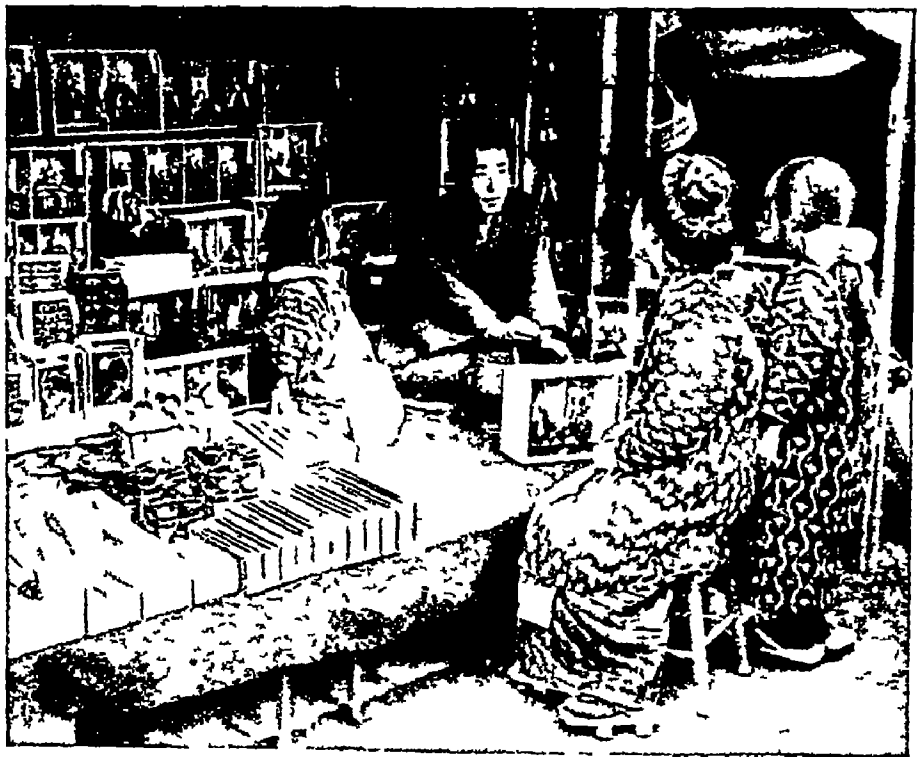
make 3,000 of these little pictures? Do you wonder that it takes years of constant study to learn to read more than the simplest writing?

While Taro and Yuki are little they have most of their lessons in common When ready for high school, they go to separate schools Yuki will study household arts, tea-ceremony, flower-arrangement, painting, music, and sewing Taro will learn fencing and the special kind of wrestling that the Japanese call "ju-jutsu" Of course, he will need also to work very hard at his study of English, so that he may be able to understand his foreign teachers when he goes to college

If you should ask Yuki what day in the year she likes best, she would not be long in answering you At once she would say, "O Hina Sama," meaning "Dolls' Festival" This is a special holiday for Japanese girls, and is celebrated on the third day of the third month of the year The festival is kept throughout the nation in every home in which there is a little girl Days beforehand the family gets ready

The dolls are placed upon a tier of shelves made like a miniature grand-stand This is covered with bright red cloth On the very top shelf sit two noble figures representing the emperor and the empress Next below come three ladies, and below them five musicians

Every family owns these special dolls, and most have a good many more There are dolls



PREPARING FOR THE DOLLS' PARTY

Here you see two happy little Japanese girls choosing their dolls at a special stall in the streets of Tokyo Every year on March 3 all the girls have a special holiday so that they may hold their great dolls' party Dressed specially for the occasion, the girls share meals of lovely cakes and syrups with their dolls.

Courtesy Nippon Yusen Kaisha

representing knights and warriors, dancers and clowns, children and babies, old men and women. On the bottom shelves are set out toy furniture, cooking utensils, and food. Peach blossoms adorn the display, and at night lighted candles make the scene even brighter. On the afternoon of the third of March Yuki will invite all her little friends to her home. They will play with the dolls, and after pretending to feed them with cakes and sweet wine, will eat and drink all the good things themselves.



ON THE MORNING OF 'TOY-DAY'

Just over two months after Japanese girls have had their Feast of Dolls, their brothers celebrate their Feast of Toys. Like the girls, they play with their dolls indoors, but they have other sorts of toys as well. Outside in the garden flags are flown resembling giant carp, the symbol that represents all that is manly in the boy.

The celebration of the Dolls' Festival is not all play. Yuki's mother and grandmother make use of the occasion to teach her lessons in politeness and good taste, and loyalty and respect for the Imperial family of Japan.

On the fifth day of the fifth month Taro has his particular holiday. This is the "Boys' Festival." Instead of dolls, swords, helmets, pieces of armour, and figures of warriors adorn the red-covered shelves. A pole is set up in the garden and from its top floats a huge cloth fish, its round mouth wide open to the breeze.

The carp is chosen as the symbol of the Boys' Festival. Taro's father tells him that as the carp swims upstream and leaps over waterfalls,

so must he swim up the stream of life and overcome all difficulties. Taro's mother makes some cakes of bean paste for his supper, and before he goes to bed he takes a hot bath in which iris blossoms have been steeped. This is supposed to make him very strong.

Taro and Yuki both think that bedtime is the nicest time of the day. For then they sit by the charcoal brazier and listen to the fairy tales which no one can tell so well as Granny. "Granny, tell us about Momo Taro, the boy who sprang from a peach," pleads Taro.

"No, no, Granny, tell about the Sparrow with the Split Tongue," begs Yuki.

Granny smiles and says, "Settle it between yourselves."

So Taro and Yuki settle this in the way they decide all their disputes—by the game of John Kem Po. This is such a good way of deciding an argument that English boys and girls might like to practise it, too.

They put their right hands behind their backs. Then they shake their other fist, doubled up, in front of them, saying "John Kem Po" three times.

As they say it the third time, they show their hand to represent scissors, paper, or stone. The first two fingers spread out mean scissors, the wide open palm stands for paper, and the clenched fist is a stone. Stone dulls scissors, scissors cut paper, and paper wraps stone. So stone wins over scissors, scissors over paper, and paper over stone. This time Taro happens to choose scissors, so he beats Yuki, whose flat pink palm shows that she has chosen paper.

"All right, Granny," Yuki says good-naturedly. "Taro wins and Momo Taro it shall be." So Granny repeats the oft-told tale of the Peach Boy and his wonderful feats in conquering giants and bringing home immense stores of hidden treasure.

And so it comes about that, as a result of all this love and careful training in their home, Taro and Yuki grow up to be good and useful citizens. Yuki remembers to good purpose all that her mother and Granny taught her, and, with the lesson of the carp ever before his eyes, Taro will be prepared to grapple with and conquer any difficulties that may come his way when he has grown to be a man.

COLOUR IN THE JAPANESE SCENE



11 Hill

As the traveller wanders through the towns and countryside of Japan he meets at every turn with charming and colourful expressions of Man's taste for beauty matched with the loveliness of Nature's making. Some suggestion of what he sees is shown in this colour-sequence. Above as a commencement, we glimpse beyond the green and mauve of leaf and flower the many storeyed Yasaka Pagoda of Kyoto the old time capital of Japan that has been called the city of a thousand temples.



Rev. B. Weston

IN A JAPANESE GARDEN

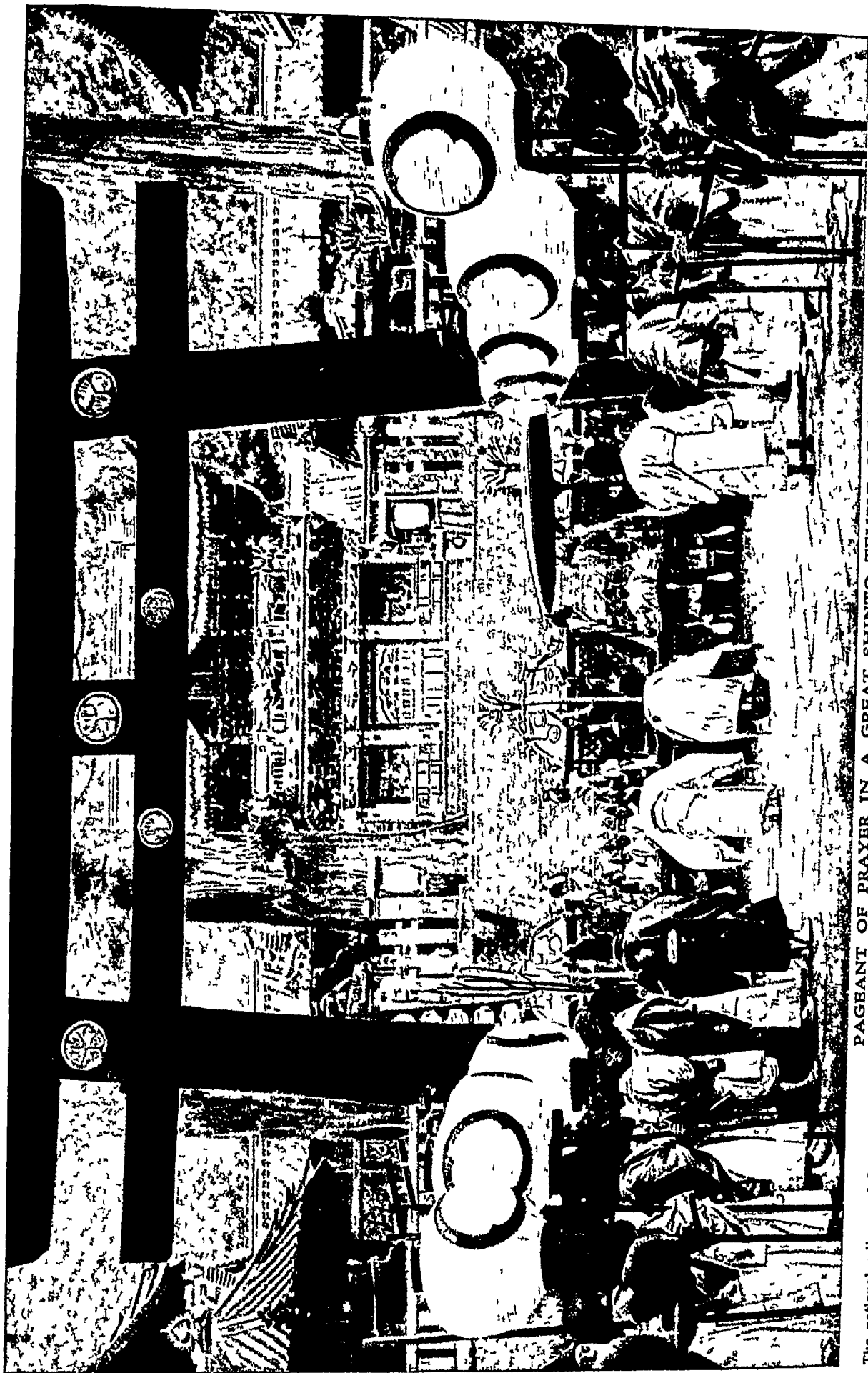
When the favourite cherry blossom has died the Japanese look forward to the flowering of the wistaria. In this lovely garden the blossoms hang like a canopy above many a path and pool of a temple precinct. No Japanese garden is really complete without an artificial pool, and here the purple blossoms are reflected in the still water.



Rev W Weston

WHEN THE IRIS IS IN BLOOM

Another favourite flower of the Japanese is the iris and the Japanese variety is large and of a lovely mauve. June is the month of the iris, and at that time of year the people of Tokyo make a special trip to see the acres of iris blossoms in the famous Gardens of Hori-Kori, just as Londoners go to Kew Gardens in bluebell time.



PAGEANT OF PRAYER IN A GREAT SHINTO TEMPLE OF JAPAN

The national religion of Japan is Shintoism, a faith of unknown origin and very primitive in type. The chief deity is the sun goddess Amaterasu. There are no idols or images but the goddesses are invoked through inferior beings the majority of whom are deified men. Gaily-decorated litters, supposed to contain these intangible beings are carried from shrine to shrine. Such a litter is here seen as it is at the time of the pageant.

Courtesy of Hestia Parlor



H. H. Weston

A JAPANESE SERVANT OF BUDDHA

In Japan there is complete religious freedom no faith being State-supported. After Shintoism Buddhism is the prevailing faith and has many institutions and temples. This abbot of a Buddhist monastery sits for hours on his heels in silent contemplation. He is of the Zen sect which nearly resembles the Buddhism of India.

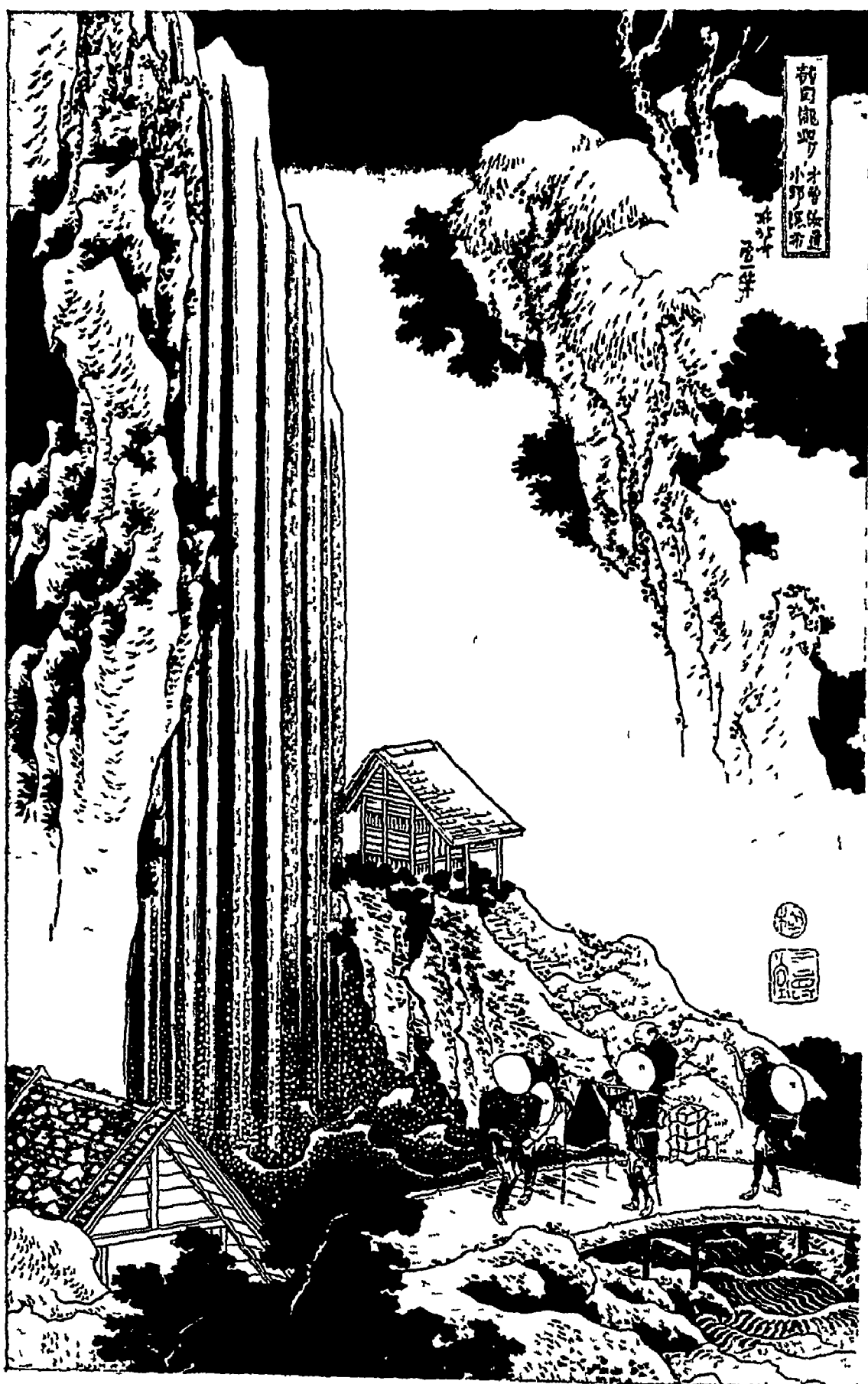
LOVELY JAPANESE PRINT OF THE 18th CENTURY



The print reproduced above is a portrait of Ujiyama, a famous Japanese beauty of the 18th century. It is the work of Hosoda Eishi (1746-1829), one of the most distinguished print-makers of his time. His work is particularly notable for the beautiful composition of figure subjects, and for the subtle colour combinations which he achieved with wood-blocks.

From the Clarence Buckingham Collection

ONE OF HOKUSAI'S BEAUTIFUL WATERFALLS



The great charm of Japanese art lies in its decorative value and in colour harmonies so delicate as to be untranslatable into black and white. It cannot be judged by Western standards, for it has its own principles and rules of composition. Hokusai Katsushika (1760-1849), the artist of this example, is regarded as the greatest of the Japanese colour-print makers.

From the Clarence Buckingham Collection



Rev. W. Weston

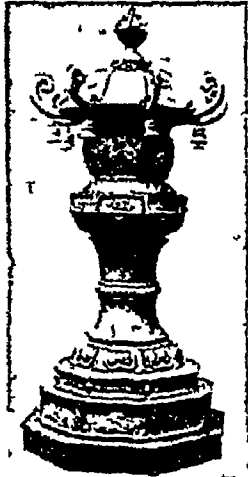
SNOW-CLAD BEAUTY OF FUJIYAMA

Above the still waters of a lake stands the stately peak of Fujiyama, Japan's greatest volcano, rising to a height of 12,395 feet, far above the snow line. In ancient times great streams of lava flowed from its crater. Some of them dammed the rivers on the north and west sides, forming a series of lakes, from the shores of one of which this photograph was taken.

ART in a LAND that LOVES BEAUTY

Everyone in Japan is an artist in a certain degree, and even in the poorest household all objects are designed to produce the most beautiful effect, while the wealthy surround themselves with all that is elegant

Japanese Art. A love of the beautiful in Nature and Art is the inheritance of every Japanese child. The sense of beauty is universal among the people, and one of the great charms in this land of so many fascinations is the fact that not only do her artists know how to produce marvellous porcelains, tapestries, and colour prints, but that in the daily life of even the humblest there are exquisite taste and refinement. The iron kettles, cheap earthenware, and blue and white towels used by the poor are as artistic in their way as the expensive porcelains and beautiful embroideries of the rich.



Japanese temple lantern

This artistic sense is strikingly evident in Japanese architecture. If we visited Tokyo or any other large Japanese city today, we should see some sky-scrapers like those in America. But we should also see many examples of native Japanese architecture—quaint many-storeyed pagodas, palaces with massive stone terraces and fragile wooden houses with open verandas and roofs of beautiful tiles or homely thatch that turn upward at the edges.

Everyone is to a certain extent an artist, and a brief glimpse into the training of Japanese children will show how this has come to be. In the Japanese language there is only one word, "kaku," for writing, drawing, and painting. From this it is easy to see that writing has always been looked upon as one of the fine arts. At least three or four thousand Chinese characters must be learned for daily use, and most of these may be written in several ways. The student who wants to become a scholar must learn twice as many. Instead of placing his roll of paper upon a table as an English lad would, the Japanese student holds it in his left hand, he, therefore, must write from the shoulder and elbow as well as the wrist. He uses a brush dipped in Indian ink, and his writing paper, being porous, absorbs it immediately, thus producing strength, precision, and grace.

After the art of writing has been learnt, painting is the next step. For the Japanese child, no matter how young he may be, looks forward with eagerness to the time when his

fingers will be sufficiently skilled to paint the beauties of the cherry blossom season, the moon rising over a pine tree, or the grandeur of Fujiyama, the sacred mountain of Japan. Many a laborious hour does the young artist spend in learning how to make a single stroke. Over and over again he strives to gain mastery of the few bold strokes that represent a river or the straight lines picturing rain, blades of grass, or shoots of bamboo. But the painstaking labour is not so tiresome to a Japanese child as it would be to an English child.

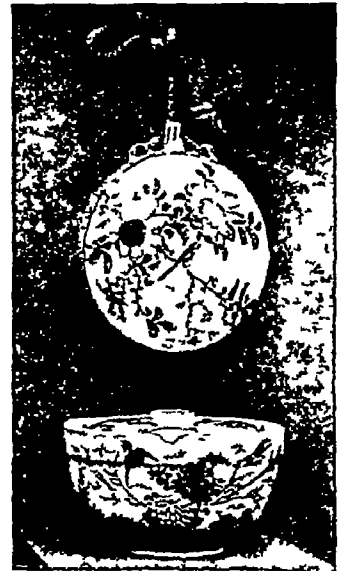
The love of the beautiful is seen again in their fondness for flowers. Flower-arrangement is taught as one of the arts, and much time is spent in learning, by twisting, bending, and clipping, to make each blossom and twig look

as though it were actually growing. The making of miniature landscape gardens and pictures out of smooth white sand and tiny stones on lacquer trays is another artistic pursuit that gives delight to Japanese children.



All this has given rise to the assertion that there are no mechanical arts in Japan, because they have all been raised to the position of fine arts. This is surely true of the work of the potter, the wood-carver, and the craftsmen who produce such marvellous results in cloisonné, damascene, ivory, bronze, and lacquer.

The potter's wheel, according to tradition, was introduced into Japan from China in the 8th century A.D. Five centuries



JAPAN'S ARTISTRY

Top is a sword guard showing a garden scene in inlaid gold and silver. Below are a bottle and bowl of Satsuma ware.

Victoria & Albert Museum



A JAPANESE HOME

The airy walls of the graceful house above are set in grooves to slide to and fro and thus cut off or combine rooms. The walls are made of waterproof paper held by light lattice work. The beautiful wall panels (right) are the chief decorative feature of the interior. The house belongs to a wealthy family in a Tokyo suburb.

later a Japanese potter discovered the art of glazing. Small jars of stoneware with brown glazes flecked with black were his first production.

In 1598 the Prince of Satsuma invaded Korea and brought back with him seventeen skilled potters, who taught the making of a ware which was called "Satsuma" in his honour. This is a glazed earthenware of firm texture, much like porcelain, decorated in colour, and with the surface "crackled" just perceptibly. This so-called Satsuma ware is now made in a number of Japanese cities and is very popular for export trade. At the close of the 16th century a Korean potter at work in Japan discovered on Mount Izumi (in Hizen province) a peculiar clay needed to reproduce the blue and white porcelains of China. This "Hizen"

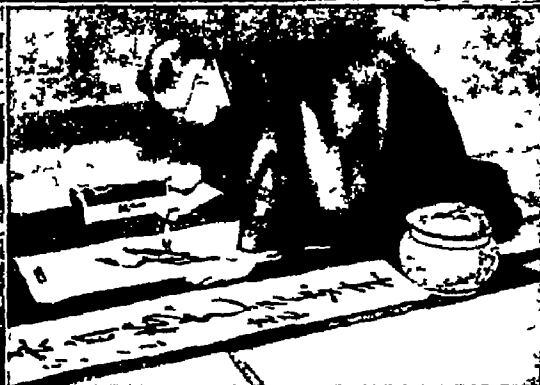


ware, known also as "Arita," from the town of its manufacture, and "Imari," from the place of exportation, is today one of the finest wares made in Japan. The two centuries from 1645 to 1845 were the golden age of Japanese pottery. During that time the work was carried on under the patronage of noblemen and gentlemen of wealth, and no expense was spared.

In the museums of Nara and Kyoto may be seen some wonderful examples of the ancient wood-carver's art, in the form of images be-

heved to date from the 6th and 7th centuries A D At the end of the 16th century there was a new development in wood-cutting, in the carved decorations of temples, coloured in gold and vermillion, the favourite Buddhist colours These carvings represent flowers, birds, angels, and dragons, and appear on pillars, gateways, ceilings, and palisades One of the finest gems of the wood-carver's skill is the "netsuke," a little figure which is used to fasten the cord on a gentleman's sash or the string of his tobacco pouch The faces of these tiny netsukes are of wonderful expressiveness

The most notable piece of bronze in Japan is the Daibutsu,



COMFORT WITHOUT FURNITURE

Honoured guests in the Japanese home are entertained in that dainty corner shown in the top picture A vase or other household treasure is place on the platform, and the family's prize print is hung above it Ornament and panel are changed as often as the guest repeats his visits. Even in hotels the Japanese use little furniture, as you see on the left. Visitors sleep on the floors The last picture shows why the Japanese need no desks for writing—they do their writing on the floor

as cloisonné, the Japanese workman has no superior in the world

or Great Buddha, at Kamakura—nearly fifty feet high The image was formed of sheets of bronze cast separately and finished off with a chisel In ancient times the bronze-maker devoted himself almost entirely to the art of making images and temple adornments Nowadays he makes ornaments, etc , for sale

This is also true of the ivory carver-and the master of damascene art Instead of idols the ivory-carver is making statuettes, fans, and umbrella handles , instead of fashioning Samurai sword hilts, the worker in damascene is devising fashionable jewelry In the ancient art of inlaying steel and iron with silver and gold, as in the elaborate enamel-ware known

Lacquer, too, is an art product in the making of which Japan cannot be excelled The lac used is made from the poisonous resin of a tree belonging to the sumac family It is applied to the wood in thin layers, and after being dried in a steam chest is carefully rubbed down and polished The whole process is repeated over and over again with great patience, until the desired finish is obtained

Of all Japanese arts, that of colour printing is the most admired It unites the dexterity of the wood carver and the skill of the painter, to form an art with power in every line and likewise grace and lightness of touch The artist first draws his picture on transparent



JAPANESE CARVERS TURNING TUSKS INTO ELEPHANTS

No elephants in the circus world were ever so celebrated as those elephants the Japanese ivory carver has caused by the wizardry of his skill to march in procession out of an elephant tusk. That scholarly-looking gentleman is none other than Komei Ishikawa, the greatest ivory carver in Japan and, therefore, the foremost ivory carver of the world! The love of art is one of the most distinguishing characteristics of the Japanese, and they carry it into everything. The Japanese boys and girls, for example, devote the same loving care to making the letters of their alphabet that artists in other lands do to painting or drawing. Even kitchenware in Japan is usually a work of art.

paper. Then the wood-carver pastes the drawing on a cherry-wood block, and dexterously cuts away the wood between the lines. Finally the printer mixes his vegetable colour with a rice-paste and applies it to the engraving. A sheet of paper is placed on the inked block, and it is pressed down by rubbing with a pad. With painstaking care a separate block is made for each colour, and colour after colour is printed until the original conception reappears in the finished print.

The supreme triumphs of colour printing came during the 18th and 19th centuries, for that was the time when the great masters lived—Harunobu, Utamaro, Toyokuni, Hiroshige, and Hokusai—men almost as well known in the West as in the East. Collections of prints that

found their way to Europe in the 19th century, aroused great admiration, and had immense influence upon artists of the West generally.



NAKED FLOWERED JASMINE

One of the most popular of all winter flowers, this jasmine, which grows usually up the side of the house, blooms all through the coldest time of the year. Yet its sweet-scented, yellow flowers are unprotected by any leaves which might shield them from frost or rain.

The modern school of "Impressionism" which began in France was partly inspired by the Japanese artist. The West, too, has had its influence upon the East. Tokyo has a school of art where painting in the manner of the West is taught by foreign and Japanese artists. But recent years have seen a return to their own native art, with a desire to maintain the fine traditions of earlier days.

Jasmine. Hidden among its dull green foliage, the lovely blossoms of this common shrub give out the sweetest of perfumes, and it is not surprising that wherever it grows it is a favourite garden flower.

There are over a hundred species of jasmine, natives especially of the warmer regions of the Old World, and there is at least one South American species. The Chinese yellow jasmine, *Jasminum nudiflorum*, blooms profusely during the winter, long before the leaves have put in an appearance. The yellow-flowered evergreen jasmine (*J. fruticans*), is a delightfully fragrant kind, it is native to southern Europe, where another yellow species, *J. humile*, is now also a well established wild flower.

The most popular species of all, however, is the white jasmine, *J. officinale*, a native of

Persia and India. It is usually grown against the house or the garden wall, not only on account of its lovely scent, but also because it is a profuse grower, with long, slender and very weak stems—this last feature is, indeed, characteristic of most of the jasmynes. The height of this lovely plant may exceed fifteen feet. In the south of France and elsewhere round the Mediterranean an oil much used in the perfumery trade is extracted from jasmine blossoms, while the Chinese species is used in the Orient for scenting tea, and in Turkey the wood is used for making pipe-stems.

'THE PEARL of the EAST INDIES'

This island is called a "pearl" for two reasons not only is it a place of great natural beauty, but also its products are of great value to the Dutch, in whose colonial empire it is the largest land

Java. Long ago, legend tells, an aged ruler of Java, "the Pearl of the East Indies," lay dying. From his court in the misty mountain heights, where grow the oak, teak, chestnut, and towering blossom crowned rasamala trees, his sons set out to search for a balm to heal him. And many and strange were their wanderings.

Like most natives of Java, Gundohl and Sukorini had yellowish-brown skin, black hair and eyes, and flat noses. Both were dressed in the thin cotton trousers and short coat of bright-coloured silk that form the usual garb in the tropical climate of the island.

Up and down the cultivated slopes of the mountain range stretching the length of the island Gundohl climbed. He sought the magic balm even in the lava beds around the two score volcanoes which still rumble and breathe into the heavens their flame reddened spirals of thick smoke.

He journeyed over Java's many green clad ravines and sparkling rivers across prairies of silvery grass, with their great herds of deer and through bamboo thickets where the tiger still roars defiance at white helmeted European hunters.

He ventured down into the island's rainy vine-draped forests, alive with myriads of destructive buzzing insects, and haunted by the fierce wild cat, the wild boar, and the rhinoceros.

The sudden coming of night—for at the equator there is scarcely any twilight—would sometimes find Gundohl feeling his way through some marshy jungle where the "flying fox" and other great bats, some measuring five feet across the wings, whiz in and out of the tree tops,

while mischievous monkeys hang by their tails from the branches. In the sluggish streams of such woods the ravenous crocodile awaits his prey, and the innumerable snakes which kill scores of Javanese every year twist their slimy bodies over the orchids and the mosses.

At last Gundohl came to a river by which was a cave. And lo! out of the cave tripped a beautiful maiden, Tuan Patrie, who gave to Gundohl the magic balm.

Meanwhile, the weak Sukorini had grown weary of his search. Going down to the seashore he idled away his time among the luxuriant ferns and palms.

As ill luck would have it, he met Gundohl and Tuan just as they were about to depart,



ROADSIDE COOK OF JAVA

Though the meals which this man cooks would not perhaps be very agreeable to Western tastes, they are thoroughly enjoyed by the natives. When customers run short he can sling his kitchen over his shoulder and move on to a new pitch.

JAVA

and—wretched scoundrel—stole the balm and hastened back with it to his father. Contaminated by his touch, however, the balm failed to heal the dying old man.

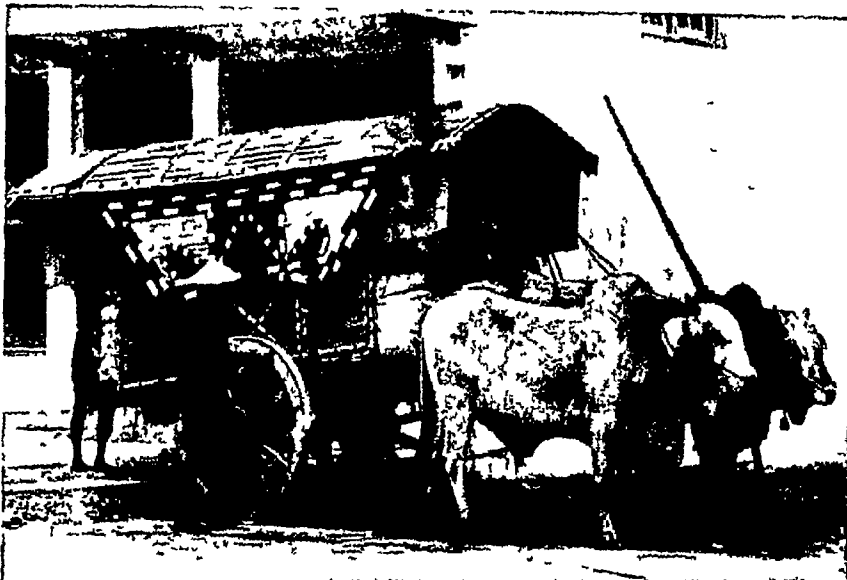
At length, Gundohl and Tuan arrived, and when Gundohl applied the balm his father was instantly cured. The deceitful Sukorini was banished, and Gundohl and Tuan were married and later inherited the Kingdom of Java.

From this legend originated the names of the Gundohl River, the Cave of Gundohl, and the Grave or Mound of Sukorini, which are still wonder spots much visited by the Javanese.

Today motor-cars speed inland over asphalt roads and mail-planes fly swiftly en route for Holland from Batavia, capital of the Dutch East Indies and a seaport of some 440,000 inhabitants. Sourabaya, where Dutch

houses crowd against Javanese shops, is Java's chief port and naval station and is also on the air line. It has 360,000 residents.

Nature has been especially generous to Java. The long narrow verdant island—660 miles long and 40 to 125 miles broad—has an area of 48,504 square miles. Valuable forests cover a fourth of the land. Chief of the timber trees is the much-prized teak. Among the many other



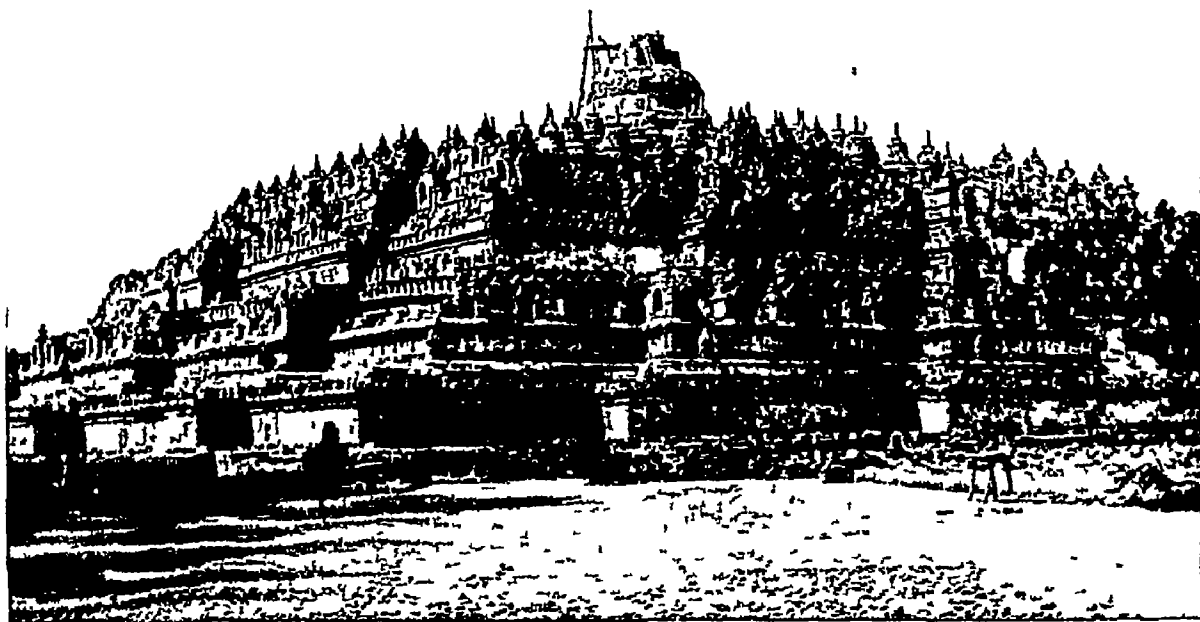
LIFE ON LAND AND WATER IN JAVA

Many of the ways of the Javanese are primitive. At the top is a heavy bullock cart without springs and with sides and a roof of cane and bamboo. Below, Javanese fishermen are casting nets from their rafts. The nets are of string or of metal rings, and great skill is required in manipulating them. In the foreground a man is casting his net towards the camera.

trees is the tall upas (native word for "poison"), whose bark has a poisonous juice in which the natives dip the tips of their arrows.

The rich black soil is prodigiously fertile, producing a wealth of flowers, fruits, and cultivated crops and concealing most of the villages in luxuriant verdure. The climate ranges from tropical to temperate as one ascends the mountains. In the lowlands are the sugar and cotton plantations and the flooded rice-fields, ploughed by the labour of the strange mouse coloured buffalo of the island. A little higher are the famous coffee and tea plantations and groves of evergreen cinchona.

WONDERFUL WORKS OF MAN & NATURE IN JAVA



This is the great Buddhist temple of Boro Budor, one of the architectural marvels of the world. Strictly speaking it is not a temple but a hill surrounded with terraces of stone, in which are cut in relief thousands of figures telling of the religion of Buddha, and inviting mankind to the higher life. On the lowest terraces are scenes of ordinary life, men fishing, playing music, and so on. As the devout Buddhist ascends from terrace to terrace, he beholds the principles of the Buddhist religion portrayed in symbolic figures until finally at the top he comes to an image of Buddha himself.



This view taken near Batavia, Java, gives you some idea of the density and luxuriance of the vegetation in that "Pearl of the East Indies." Great palms rise from the river's brink, while further back grow teak and upas trees, and countless other forest giants.

JAVA

trees which yield a large proportion of the world's supply of quinine. Higher yet grow tobacco, cereal crops, and potatoes.

Its population of about 42,000,000 makes Java one of the most densely peopled regions in the world. The two chief groups of natives—the Javanese and the Sundanese—speak distinct tongues, though they are both of the Malayán race. Furthermore, each of these languages has three complete vocabularies, one used in speaking to superiors, one to equals, and one to



THE PERKY JAY IS A NOISY BIRD

Although he makes a most unpleasant noise and does a great deal of damage, the cheeky, handsome jay is forgiven to a certain extent, for of all our birds he seems perhaps to have the most humorous outlook. This one certainly seems to have seen a joke, for if ever a bird could be said to be laughing he surely is.

inferiors. Though simple and superstitious, the natives are peaceable and industrious, nearly all of them being employed on the plantations. Cock-fights and a sort of Punch and Judy show are their chief amusements, and they are passionately fond of the weird music of orchestras composed largely of gongs and drums. The ancient faith was Hinduism, as is attested by the many ruins of splendid temples. The great

JAY

temple of Boro Budor is probably the largest Buddhist temple in the world. Its statues and bas-reliefs placed side by side would form a line three miles long. Since the Arab conquest in the 15th century most of the people have been members of the Mahomedan faith.

The Portuguese were the first Europeans to establish relations with the natives (about 1520), but were soon supplanted by the Dutch, who now rule the island. Holland derives from this colony a considerable portion of its revenues.

The native sultans are in the pay of the colonial government and have only nominal authority. A large part of the exports—sugar, tobacco, tea, rubber, cinchona, copra, tapioca, pepper, coffee, timber, tin, and hides—go to Holland. Petroleum production is also important. The small island of Madura is attached politically to Java, while Bali, the home of the famous temple dancing-girls, lies close to its eastern extremity.

Jay. Walking through a quiet English woodland, listening perhaps for the notes of some favourite bird or hearing the drowsy hum of insects, you may suddenly be startled by a veritable screaming, a harsh, grating noise, as though several birds were saying very unpleasant things to one another at once. This is the sound of a jay, one of the noisiest of all our birds, whose voice is but one of the reasons for his unpopularity. With other birds and wild creatures he may indeed be quite popular—at least when he gives the alarm at the approach of anything strange, but with them, as well as with ourselves, he becomes more unpopular still when he takes to egg-stealing, a habit which has justly earned him a bad reputation. Not only small birds, which we welcome as songsters and because they eat insects, but even the protected game-birds suffer from the depredations of this villain, so that the keeper's hand—and his gun—is against him. The fruit farmer, too, dislikes the jay, for he loves a ripe apple or pear.

For all that, the jay is common wherever there are woodlands, and especially on the outskirts of London, where there is plenty of food and where few natural enemies are at hand. And there, too, he may be almost welcomed, for no one can deny that he is one of the most handsome of birds, with rich, warm chestnut as his main colour and a lovely patch of blue and-white cheek on his wings. These little wing feathers are much in demand as hat ornaments.

The jay, like other members of the crow family, makes a nest of sticks, etc., resembling an enlarged edition of that of the blackbird. This is usually placed in the fork of a tree, fairly high up, and in it are four or five olive brown, speckled eggs. If disaster comes upon the first set another clutch may be laid.

Jazz. Shortly before the World War broke out in 1914 there burst upon an unsuspecting world of sentimental music hall ballads and dignified waltzes an entirely new and then very puzzling form of popular music, to which the name of "ragtime" was given. This, so its promoters in London assured their public, was derived from the genuine folk music of the American negroes.

The essence of ragtime (forerunner of "jazz") was the introduction of syncopation—in other words, the accented note very often did not fall where one expected, and sometimes there were accents galore, but most people seemed quite satisfied with the new order of things. During the War days many an old gramophone in the front-line trenches churned out the first popular "hits" of jazz. When all was over and everyone tried unsuccessfully "to forget" and to recapture pre War peace and pre War prosperity, it was American jazz in strangely perverted and noisy forms that formed the theme song of the new era.

Since the early post War years jazz has toned down and developed into "dance music" and has been honoured by the attention of several "highbrow" composers. It is probable, however, that the most lasting contributions to this type of music have been made by negro musicians like Duke Ellington and Louis Armstrong—apostles of "hot" music and "swing," and masters of eccentric instruments like the saxophone, trombone, trumpet and tap drum. Two other Americans who must be mentioned are George Gershwin (died 1937), the composer of serious works like "Rhapsody in Blue," and Paul Whiteman, the original "King of Jazz."

Jeans, Sir James Hopwood (born 1877). Only a few years ago astronomy and astrophysics, the sciences which deal with the Heavens, were as closed books to all but the most advanced mathematicians. And as these lived in a kind of world apart, a world composed of abstruse theories, intricate formulae and complex text-books into which the ordinary person with an inquiring mind might not enter, there was little opportunity for the "man in the street" to glean much knowledge of the universe beyond the names of the planets and chief stars and constellations. There his information stopped, and might have stopped indefinitely, but for the happy arrival of Sir James Jeans, almost the first scientist to make it possible for schoolboys and grown-ups of

ordinary intelligence and education to obtain a comprehensive grasp of the universe.

Jeans, whose father was a Londoner, was born on September 11, 1877. After a brilliant career at Trinity College, Cambridge, he was elected a fellow of his college and in 1904 appointed lecturer in mathematics. From 1905 to 1909 he was professor of applied mathematics at Princeton University, U.S.A., returning to fill the Stokes lectureship in the same subject at Cambridge, 1910-12. From 1919 to 1929 he was Secretary of the Royal Society, of which he was made a fellow (F.R.S.), and in 1923 he was appointed research associate of Mount Wilson Observatory in California.

This bald recital of Jeans's scholastic achievements and honours tells us, however, very little of the personality and genius of the man who has been universally acclaimed one of the most forceful and stimulating thinkers of the age. To appreciate Jeans we must read, not necessarily technical works like "Problems of Cosmogony and Stellar Dynamics," or "Atomicity and Quanta," but "Eos," "The Universe Around Us," "The Mysterious Universe," or "The Stars in their Courses."



SIR JAMES JEANS

The famous astronomer, Sir James Jeans, is here examining a giant telescope built at Mount Wilson Observatory in California, where he was a research associate for several years. Besides being a great scientist, he is also a popular writer of illuminating books on astronomy and physics.

In "The New Background of Science" (1933) Jeans presented a fascinating speculation on the nature of the universe, suggesting that it might be a thought in the mind of a mathematician!

Jefferies, JOHN RICHARD (1848-1887) If you have any interest in literature, or in natural history, in the English countryside, or in the English classics, you will sooner or later come across the works of Richard Jefferies

Jefferies passed most of his life in poverty. He was born near Swindon in Wiltshire, November 6, 1848, and he died at Goring, Sussex, August 14, 1887. After a shiftless youth he became a journalist, having already published a few novels which had little success, and specializing in articles on natural history and rural life. His name was made by a series of essays in the "Pall Mall Gazette," which, appearing as "The Gamekeeper at Home," brought home to Londoners, perhaps for the first time, the poetic beauty and the interesting scientific variety of the countryside, besides the great knowledge and literary charm of their author. The same characteristics distinguished his "Wood Magic," which came out in 1881. In this he made his characters—the animals—speak and think and experience emotion like human beings, and created the charming character of Bevis, the child to whom their life was fully revealed.

The style of this book, as of some of his others, is a most effective mingling of prose and poetry, for, while written in prose, it rises to heights of intense poetic beauty and reveals imaginative power seldom surpassed in his century. His contemporaries, however, gave Jefferies little encouragement, and it is only since about 1900 that he has really come into his own. His later novels and "The Story of My Heart," a mainly autobiographical revelation of ardent emotions aroused by the wonder of Nature, earned him little money, and his last years were clouded by terrible physical suffering as well as by poverty. His other books include "The Life of the Fields," "Red Deer," and "Amaryllis at the Fair."

Jefferies was of an independent, stern, and unsociable nature towards his human fellows, save alone towards children, but as he wandered on the downs and through the woods of Wiltshire and Sussex, observing animals and birds, his character suffered an entire change



RICHARD JEFFERIES

A great lover of Nature and a most attractive writer, Richard Jefferies wrote books on country life which have enthralled many thousands of readers

Bust by Margaret Thomas National Portrait Gallery

Jefferson, THOMAS (1743-1826) Born in Virginia, of Welsh descent, Jefferson was naturally a bold and fearless thinker, and read deeply in the English and French political philosophers. Elected to the Virginia House of Burgesses in 1769, he won imperishable fame as the draftsman of the American Declaration of Independence six years later.

In 1800 Jefferson became the third President of the U.S.A., and tried to put into practice his cherished ideas of democratic simplicity. In general the four years of Jefferson's first administration were years of prosperity, the greatest event was undoubtedly the Government's "Louisiana Purchase" from Napoleon (1803), whereby 1,000,000 sq miles of territory were added to the U.S.A. Jefferson was re-elected in 1804 by an overwhelming majority. An important event of his second term was the passage of a law forbidding the slave trade after January 1, 1808. But overshadowing all else were the difficulties in foreign affairs which finally led to the second war with Great Britain.

Jefferson died on July 4, 1826—just 50 years after the adoption of the Declaration of Independence. In accordance with his request this epitaph was inscribed on his monument: "Here was buried Thomas Jefferson, Author of the Declaration of American Independence, of the Statute of Virginia for Religious Freedom, and Father of the University of

Virginia." He is remembered as one of the greatest Presidents of the U.S.A.

Jellicoe, JOHN RUSHWORTH JELlicoe, EARL (1859-1935) The Commander-in-Chief of the British Grand Fleet at the Battle of Jutland (qv) was born in Southampton, his father was a captain in the Mercantile Marine, and his great-grandfather was Admiral Philip Patton, who fought bravely with Hawke and Rodney, and was Second Sea Lord in 1805, the year of the battle of Trafalgar.

It is small wonder, therefore, that from his earliest years he was fond of everything connected with ships, sailors, and the sea. After a period of schooling at Rottingdean he entered the Navy as a cadet in 1872. On the Britannia he passed first in all the examinations. Promoted to lieutenant in 1880, he had his first taste of active service two years afterwards in the Egyptian war on H.M.S. Agincourt, receiving

JELlicoe

the Egyptian Medal as well as the Khedive's Bronze Star

When he proceeded to the Royal Naval Academy in 1883, he again showed great ability, and won the special £80 prize for gunnery

Jellicoe's third medal, awarded to him in 1886 by the Board of Trade, was for an act of conspicuous bravery in attempting to rescue the crew of a vessel in a perilous position on the sands near Gibraltar. The boat which he commanded capsized, but fortunately all its occupants escaped by being flung up on the beach. After a spell of work as assistant to Captain John Fisher (later Lord Fisher of Kilverstone), who was then Director of Naval Ordnance, Jellicoe became commander of the Victoria, the flagship of Admiral Sir George Tryon. When this battleship—the pride of the British Navy at the time—was rammed by the Camperdown off Tripoli, he was lying seriously ill in his cabin, and had an almost miraculous escape from drowning. The future admiral became Sir Edward Seymour's Flag-Captain and Chief of Staff in the expedition to relieve the legations at Peking (1900). He commanded the Naval Brigade, and was

wounded at the battle of Pertsang. In turn Jellicoe became Naval Assistant to the Controller of the Navy and Director of Naval Ordnance and Torpedoes, and he was also appointed a member of the important committee which examined the question of the design of the famous Dreadnought.

After a further period at sea Jellicoe returned, as Third Sea Lord and Controller of the Navy, to Whitehall, where he remained until his appointment in 1910 as Commander of the Atlantic Fleet. In 1912 he became Second Sea Lord, a position which he held until he was given the post of Commander-in-Chief of the Grand Fleet at the outbreak of the World War.

For his services at Jutland (fought May 31, 1916), in which the German High Sea Fleet was driven back into port, Jellicoe was promoted

JELLY-FISH

Knight Grand Cross of the Royal Victorian Order, and awarded the Order of Merit. In November, 1916, he relinquished the position of Commander-in-Chief and was succeeded by Sir David (later Earl) Beatty. He was First Sea Lord from November, 1916, to December, 1917, during which time he instituted the convoy system and augmented mining operations and the arming of merchantmen against submarines.

In the following year Sir John was raised to the peerage as Viscount Jellicoe of Scapa in the county of Orkney. For his valuable services he received a grant of £50,000, and in 1919 he proceeded on a visit to the Dominions and India to advise on naval matters. In the next year Viscount Jellicoe was appointed Governor of New Zealand, and in 1925 was created an Earl. He was President of the British Legion from 1928 to 1932. The admiral's two volumes, entitled "The Grand Fleet, 1914-1916" and "The Crisis of the Naval War," are valuable contributions to the study of the greatest conflict in history. Jellicoe died on November 20, 1935, and was buried in St. Paul's Cathedral.

Jelly-fish. These are amongst the very strangest of all sea creatures, for they are

indeed almost entirely composed of jelly—in some of them there is actually 99 per cent of jelly, while in none is there much more than a tenth of any other matter! They have not the least relationship to the fishes, nor do they resemble them in any way whatever. With the hydra (*q v*) and other similar simple creatures, they help to make up the group *Coelenterata*. They vary a good deal in size, form and shape, despite their uniformity of composition, some are seven feet across, while others are almost microscopic.

When you find a jelly-fish stranded on the sea shore, and try to examine it, you are looking at the adult stage, the last chapter of a long story of strange development. It is now a rounded, umbrella-shaped object, with a number of tentacles hanging down inside the lip of the



JELlicoe—THE HERO OF JUTLAND

Though Earl Jellicoe's tactics at the battle of Jutland have been criticized there is no doubt that his main object—the driving of the German fleet from the high seas—was completely achieved, for Germany did not risk another large-scale encounter with the British fleet.

Photo Russell Southern

JELLY-FISH



WHAT JELLY-FISH HAVE TO GO THROUGH

The business of becoming a full-grown jelly-fish is a complicated process. Here we see the life history of one of the commonest forms, the *Aurelia*. First, the egg swims about as though it intended to stay just as it is. But soon it becomes attached to the bottom and begins to grow like a plant. This is the "polyp" stage. Soon the top of the polyp, carrying the arms, moves up, and another cup-shaped segment is formed, and then another and another until there are 13 in all. This is the "strobila" stage. Then the top segment breaks off and swims away, and in the course of time turns into a real jelly-fish, like the ones you see here. Meanwhile the second segment of the strobila grows tentacles and splits off, and so on until 13 new jelly-fish have appeared.

umbrella, and, within them again, a loose ring of tissue guarding the entrance to the mouth, and called the *manubrium*, the mouth is in the middle of the underside where the handle of the umbrella would be. The tentacles are armed with stinging organs that can paralyze the jelly-fish's prey, which are then swept into the mouth. Some of these jelly-fish can sting powerfully enough to do serious hurt, should you meet one

when swimming and be unfortunate enough to get stung.

There are few other organs of interest—except to scientists—but it is rather strange that even in this lowly form of life there should be eyes, and actually, in one or two species, eyes of such advanced development as to have most of the features found in those of the vertebrates themselves. The whole jelly-like "bell" of the *medusa*, as an adult jelly fish is termed, can swim by alternately contracting and expanding itself, and that is how most of these creatures move through the water—although they are largely moved by the current.

The development of jelly fish is a long business. In those forms that belong to the division *Scyphozoa* the egg may develop into a medusa, but, on the other hand, it may form a polyp (from this other polyps may bud off), which becomes fixed to the sea bottom, and it may develop root-like growths (*stolons*), whence also polyps appear. When food is plentiful, however, and conditions for reproduction are therefore good, the cycle illustrated on the left occurs, and numerous little medusae are budded off and freed to go their own way. They are not similar to the adult form, and may pass through several stages before they reach it.

In the other great division, *Hydrozoa*, the medusoid form is less important really than the polyp form, which becomes a regular colony of branching individuals—almost, in fact, a little living tree of polyps. Each polyp is a little tubular

body, round the free end of which are a number of tentacles. (See *Hydra*.) But sooner or later buds of a new type appear, from which numerous little medusae are produced. These are of much less specialized form than the higher *Scyphozoan* polyps in most cases.

Mention must be made of the most complex of all jelly-fish, those which are members of the order *Siphonophora*. These are colonial forms,

but, unlike the ordinary polyp colonies, they float or swim in the seas and free medusae hardly ever occur. On the other hand, the colony may consist of a large number of very varied types of polyp all strung together, usually in groups, each group containing three or four different sorts. At the end of the long stalk to which all these are attached is a large



**PORTUGUESE
MAN OF WAR**

This jelly fish moves along by means of the sail formed from its upper part. Below hang down various organs and 'fishing lines'

body known as the float, which drifts along on or near the surface and which supports all the rest of the colony.

This is the most conspicuous part of the organism, and the best-known example of its functions is in the famous "Portuguese man-of-war" (*Physalia*). Here the float acts as a sail above the surface of the water, while the whole colony is a brilliant blue or orange in colour. Below the float are the groups of various organs, and from each group hangs down a long "fishing-line," covered with stinging cells, which kill the crea-

ture's prey. In this species the stings may be powerful enough to kill a human being. There is no room here to go into the details of the various forms of structure found in these creatures, but you will now realize that the simple jelly fish is much more than a mere lump of inanimate jelly.

Jenner, EDWARD (1749-1823) How a chance remark may alter profoundly the course of scientific thought is well illustrated in the life of Jenner, an English physician to whom mankind must ever remain indebted.

"I cannot take smallpox, for I have had cowpox." This remark, made by a simple country girl who was waiting in a doctor's consulting room at Chipping Sodbury, near Bristol, led to the discovery of vaccination, and so lessened the incidence of the scourge of smallpox which had ravaged mankind for 800 years, causing the deaths, on an average, of one million people each year.

Dr Edward Jenner, who happened to hear this remark in his master's consulting-room, when he was a surgeon's apprentice, was born at Berkeley, Gloucestershire, May 17, 1749. He noted its import, and, pursuing the matter further, found that there was a tradition in Gloucestershire that people who had contracted cowpox through milking diseased cows were afterwards immune against smallpox.

In 1775 he began to inquire more deeply into the relationship and, after many years of study, he made the first experiment of vaccination in 1796.

He inoculated a boy from a cowpox sore on the hand of a girl. He soon discovered that the disease had really been introduced by the vaccine virus from the girl.

When the boy's arm healed he inoculated him with the germs of smallpox, but, as he anticipated, without any ill effects. The inoculation of animal cowpox virus had produced a definite degree of immunity against human smallpox.

He now pursued his investigations, as he himself put it, "with redoubled ardour." Jenner met with many disappointments and much abuse, but the extraordinary and beneficent nature of his discovery was soon proved, and he lived to find himself one of the most famous and honoured men in Europe, and to see smallpox disappearing with the spread of vaccination.

Jerboa. If you could jump as well as this curious little animal, you would think nothing of covering 20 feet or so at a bound. Though its body is but eight inches in length, it leaps along at the rate of four feet or so each jump,

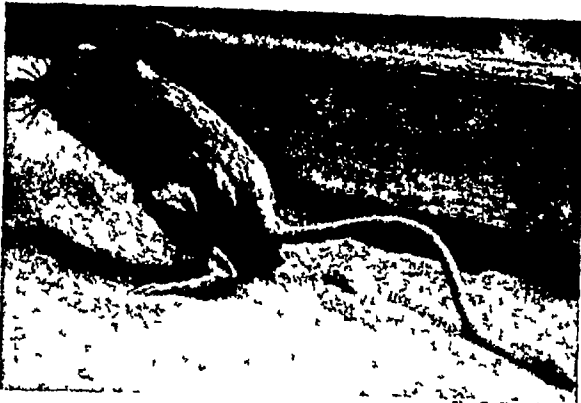


Photo Alinari

JENNER'S FIRST EXPERIMENT

Edward Jenner's discovery of the possibility of securing immunity from smallpox by vaccination has made his name world-famous. This piece of statuary by an Italian sculptor G. Monteverde is in the Palazzo Bianco at Genoa.

JERBOA



JERBOA, A TINY CHAMPION JUMPER

This strange little animal, with huge tail and enormous hind legs, is perfectly adapted to leaping about, and in the desert regions which it inhabits that is just what the jerboa does. With its tiny front legs it digs a deep burrow, while its back ones can propel it many feet at a time.

covering the ground at a tremendous speed. It is, in fact, almost a miniature kangaroo, and it provides an interesting example of what scientists call independent evolution. For though it is no relation of the kangaroos, it has evolved, on its own account, the same form for the same purpose: a smallish body, tiny little front legs that can be tucked right up close to the chest, and enormously long hind legs and tail. The tail, in fact, is actually longer than the body, and, like that of the kangaroo, it can be used as a support for the animal when it is at rest. The great hind legs, however, are nearly as long as the body, and they propel the little jerboa several feet at a jump. It lands on all fours, tips its body upright, and leaps again, so that each "stride" is a complicated process.

The forelegs of the jerboa are used for digging, and the animal lives actually in a burrow, excavated out of the deep sand of the deserts which it inhabits, often in large colonies. Besides the common jerboa (*Jaculus aegypticus*), which is found all over the desert regions of the northern half of Africa, there are several other species. What is more, there are other rodents, of quite different groups, such as the jumping mouse (*Zapus*) and kangaroo rat (*Dipodomys*) of North America, and the African jumping hares (*Pedetes*), all of which show the same development, although they have in all probability reached their present stage quite independently.

JERUSALEM

If we go even further afield, there are certain members of the group *Insectivora*, such as the jumping shrews (*Macroscelididae*), in which just the same thing has happened. All these creatures, too, live in more or less open, desert regions, whether they be true kangaroos or their smaller relatives, or rodents from Africa, Asia, or America, or insectivores. For it is only in such country, where there is firm soil and little impediment in the way of bushes, scrub, etc., that the ability to leap far and fast is of much value. And in such districts it is almost a necessity, for without it the smaller creatures would be quite unable to escape from any of their numerous foes. As it is, we see a little animal not a foot long actually outpacing a galloping horse!

Jerusalem, PALESTINE "If I forget thee, O Jerusalem, let my right hand forget her cunning!" So sang the psalmist as he thought with passionate devotion of the holy city from which he was exiled. In the Middle Ages the Crusaders, who had toiled the long weary way from their homes in Europe to redeem the city of Christ from Mahomedan rule, knelt in the dust and wept with joy as they beheld from afar the city of their dreams. Today Jerusalem still draws hosts of pilgrims.

Standing on a rocky plateau, 2,500 feet above sea-level, in the mountain region of Palestine between the Mediterranean and the Dead Sea,



Dorien Leigh

JERUSALEM'S WAILING WALL

The Wailing Wall, one of the most holy of Jewish shrines in Jerusalem, is a part of the wall which once surrounded the Temple. Jews make pilgrimages to it in memory of the destruction of the Temple. At night drops of dew exude from the wall, and the superstitious believe these to be tears shed in sympathy with the Jewish mourners.

JERUSALEM

Jerusalem, as seen from the neighbouring hills, is still as the Bible describes it, "beautiful for situation, the joy of the whole earth." Though the name Jerusalem means "city of peace," it is a natural fortress, and few cities have suffered more terrible sieges. Had it not been for the lack of water within its walls, it would in ancient days have been well-nigh impregnable, for deep-cut ravines protect it on three sides.

Separating it from the Mount of Olives on the east and northeast is the Valley of Kidron. On the west and running to the south is the Valley of Hinnom, or Gehenna. This ravine was deemed accursed in ancient times, for here at one time human sacrifices were made to the Phœnician god Moloch, and later the bodies of criminals were cast out. For this reason the name of Gehenna came to mean Hell.

The walls surrounding Jerusalem have been many times destroyed and rebuilt. Those through which we enter the city today, by one of the eight gates, were built by Sultan Solymán the Magnificent in the 16th century.

Of the splendid Temple, which was the centre of worship for all Israel, no part remains standing today. The "Wailing Wall," where every Friday Jews still gather to mourn and pray, is a part of the wall that surrounded the Temple erected by Solomon, or may, as many think, belong to later times. A Mahomedan place of worship, the Mosque of Omar, now stands on the holy spot. Eight gateways open into its courtyard, within which, in the centre of a group of buildings, is the Dome of the Rock, a fairy-like edifice exquisitely wrought of marble and coloured tiles.



JERUSALEM FROM THE TOWER OF DAVID

The Holy City is here seen from the tower of the ruined Citadel of David, near the Jaffa Gate. In the centre of the photograph is the beautiful Dome of the Rock, which stands in the middle of the Temple area. To the left of it is one of the three footpaths by which the Mount of Olives, seen in the background, can be ascended. At its summit is the Russian church.

Photo American Colony in Jerusalem

The place in Jerusalem most visited by Christian pilgrims is the Church of the Holy Sepulchre, built over the supposed tomb of Jesus. No man can point with certainty either to Golgotha, the place of the crucifixion, or to the place of Christ's burial, but for ages men have made long pilgrimages to visit these "holy places," have suffered and struggled and died for possession of them, so we cannot look without feelings of awe and reverence upon the reputed spots.

Franciscan friars tend with loving care the place which they believe to be the Garden of Gethsemane. Here several ancient olive trees are pointed out as the very ones in whose shadow Jesus knelt and prayed in anguish. Rising above the garden and overlooking the whole city from the east is the Mount of Olives.

The streets of old Jerusalem are narrow and crooked, but in the suburbs that have grown up outside the walls in recent years there are wide tree-lined streets, gardens and parks, and modern houses, though these are of monotonously uniform design. The largest new quarter lies west of the Jaffa Gate.

The history of Jerusalem goes back to 1500 B.C., when, according to the Tell-el-Amarna letters, it was occupied by the Egyptians. At the time of the Israelites' entrance into Palestine it was held by the Jebusites, a Canaanite tribe. David conquered the city and made it the capital of his kingdom. It reached its greatest splendour under Solomon. After the division of the kingdom it remained the capital of Judah until destroyed by the Romans, A.D. 70.

About A.D. 130 the Emperor Hadrian rebuilt the city and named it Aelia Capitolina. Its history from this time is obscure until the 4th century, when Constantine the Great, after his conversion to Christianity, gave orders for the recovery of the holy places and the erection of

two magnificent churches. In 637 Jerusalem was captured by the Moslems. It was won by the Crusaders in 1099 and held by them until 1187, when it was reconquered by the Saracens.

Except for brief intervals Jerusalem remained in the hands of the Mahomedans until it was captured from the Turks by British forces under General Allenby in 1917. During this period of more than 700 years it witnessed many changes.

As a result of the World War, Jerusalem became the capital of the mandated territory of Palestine, under the protection of Great Britain, and a separate administrative district of its own. The influx of Jews, especially following Nazi persecutions in Germany, produced a crisis in 1937, when the Arab section of the population demanded from Britain, the mandatory power, measures to curtail immigration into Palestine. Riots and skirmishes between Arabs and Jews became so frequent that Britain declared martial law. (See further under Palestine.) The population of Jerusalem is about 125,000.

The STORY of *the* SAVIOUR

The greatest story of the world, told in the world's most wonderful Book, never loses by repetition any of its beauty or its truth. Nor will the first Christmas and the first Easter ever be forgotten.

Jesus Christ. The story of Jesus Christ is the most wonderful the world contains. It is the story of One Who lived long ago, but Whom the world cannot forget, Who was born in a manger and died upon a Cross, Who, during His earthly life, was despised and rejected, but Whose name today is above every name, and Who is worshipped and adored by multitudes of the human race as their Saviour.

Long before Jesus appeared upon earth, men foretold His coming. Even in what are called pagan lands there was a dim expectation of someone nobler than the sons of men appearing. Especially amongst the Jews was there such an expectation. They believed in the coming of One Whom they called the Messiah, and Whom one of their prophets called Immanuel—God with us.

But when Jesus was born they failed to recognize Him. They expected someone far different, someone who would come with outward pomp and glory, and, sitting upon a throne, would rescue Israel from her enemies and make of her a mighty nation.

Nothing could exceed the lowliness of Jesus' coming into the world. When Joseph and Mary, His earthly parents, went down to the little city of Bethlehem to be counted, according to the custom of the country, they found that every house was full, nor could they find a room even in the village inn. So they had to take shelter in a stable, and there, that night, Jesus

was born, and His mother laid Him in a manger. In all the world no one knew what a wondrous thing had happened, save a few poor shepherds watching their flocks by night, who had heard the music of the Angel Host heralding the birth of the Son of God.

That very night, too, a new star appeared in the sky. There were men who watched the stars in a country far away, and they said they could tell from the movements of the stars what was going to happen. These wise men were called Magi. And they noticed this star, and after a while set out to journey to the place over which it shone, taking with them presents, for they were rich men and they expected that the star was meant by God to announce the coming of a King.

When they came to Jerusalem, King Herod heard about them and was told that they had come to seek for the young Christ who was born King. This news startled King Herod, who was a cruel man and thought that his friends were always plotting against his throne. So when he learnt that Christ was to be born in Bethlehem, he sent for the wise men and told them to go to Bethlehem, and if they found the Christ to return and tell him. Herod meant, of course, to kill the Christ Child.

So the Magi went to Bethlehem, where they found Mary and Joseph and the Child in a very humble house. They knelt and worshipped Him, and offered Him their costly presents,



JESUS AMONG THE LEARNED MEN IN THE TEMPLE

And when they had fulfilled the days, as they returned, the child Jesus tarried behind in Jerusalem, and Joseph and His mother knew not of it. And it came to pass that after three days they found Him in the Temple in the midst of the doctors both hearing them and asking them questions. And all that heard Him were astonished at His understanding and answers. This passage from the New Testament (Luke ii, 41-47) is here illustrated by Hofmann's famous painting

and next morning they intended to return to King Herod. But as they slept they dreamt that they were not to tell the king that they had found Jesus, so they returned to their own country by another road.

When King Herod heard of this he was very angry, and gave orders that all the children in Bethlehem under the age of two years were to be killed. This is known as the Massacre of the Innocents. Jesus would have been killed also if Joseph had not believed in a dream he had and gone away into Egypt with Mary and the Child.

And now for a long time we hear very little about the life of Jesus. He returned with His parents to Nazareth when the danger was past, and there in that little village amongst the hills He increased in stature and in favour with God and Man.

Happy would we be if we could know some thing about the childhood and boyhood of Jesus, but all that is hidden from us. Yet we must believe that in His secluded home, where He was patiently preparing for His mighty work, His life was full of peace and content. In

His parables and talks we see how much He loved Nature, how He rejoiced in flowers, and how all the visible world contained revelations of truth and beauty.

There is one glimpse, however, which lightens for a moment these early years, it is a glimpse of Jesus in the Temple. Joseph and Mary had gone on a pilgrimage to Jerusalem, and, returning, they missed Him. So, going back, they found Him standing in the midst of a group of learned men in the Temple, asking and answering questions, so that all were astonished at His learning.

At thirty years of age Christ began to teach and preach. First of all, He was baptized by His cousin, John the Baptist, in the river Jordan. Then He suffered the temptation in the wilderness. Jesus knew quite well what His powers were, He knew that if He liked He could get great fame or glory or riches, and the devil tempted Him with those things, but Jesus was bent on doing good to others, so He told the tempter to be gone. Then He collected round about Himself a band of men called disciples who were his assistants, and with them He

JESUS CHRIST

went about the country preaching to large numbers of people and performing miracles

Jesus spoke out, too, against the priests and the scribes and the sect called the Sadducees. These were the ministers and lawyers and unbelievers of those days. So, although the common people heard Him gladly, these priests, lawyers, and Sadducees were embittered. Multitudes followed Him, and He preached to them beautiful words of comfort—as in His Sermon on the Mount—and showed them what life really was, besides healing many poor souls of wasting diseases and illnesses.

For three years Christ went about the country healing and speaking parables—that is, telling stories—and preaching the Gospel of Love—for that was what He was continually saying that we should love one another. All the time the hatred of the Scribes and Pharisees kept rising, until at last it was hardly safe for Jesus to show Himself.

When He went to Jerusalem to keep the feast of the Passover, He knew that the end was near. Enemies were close around Him on all sides, plotting to take His life, and, alas! there was a traitor even among His disciples.

This was Judas. Of his character we know little, but when the enemies of Jesus approached him and tempted him with a bribe of thirty pieces of silver to betray his Master, he consented.

In a quiet upstairs room in Jerusalem, with the door shut and the lamps burning brightly, Jesus took His last supper with His disciples, and had His last opportunity of talking privately with them. The things He said then will never be forgotten, they are the greatest in the world. After breaking the bread and

passing the cup, He said to Judas who was to betray Him, "What thou doest, do quickly." Judas went out, and when Jesus, a short time afterwards, also went out to go to the Garden of Gethsemane and there wrestle with God in prayer, Judas had all his plan of betrayal ready. Coming from the garden Jesus was met by

the servants of the High Priest, who insulted Him and smote Him, and at length led Him to the Judgement Hall, where He had to undergo a mock trial before the High Priest. This person had not the power to pass any sentence on Christ, so he was compelled to send Him on to the Roman Governor, Pontius Pilate, who was greatly perplexed, and at first much inclined to let Christ go.

The multitude, however, incited by the High Priest and his party, shouted "Crucify Him, crucify Him!" and Pilate at last yielded, and Christ was led forth to be crucified.

Thus was the purest Being that ever lived on earth crucified upon the bitter Cross. His enemies stood round and mocked Him, but Jesus in the midst of His agony prayed that they might be forgiven. "Father, forgive them," He said, "for they know not what they do."

With this prayer of forgiveness Jesus yielded up His spirit to God, His Father, and on the third day He rose from the dead and appeared to His disciples before ascending to Heaven. He lives in the hearts of all who love Him, and the

influence which He wields increases from generation to generation. Countless missionaries have left home and kindred to spread the knowledge of His name in heathen lands, in every corner of the globe, and wherever He is lifted up He draws all men unto Him. (See illus in pages 2289 and 2291)



'THE LIGHT OF THE WORLD'

This painting by William Holman Hunt represents Jesus Christ knocking at the door of the human heart, overgrown with the brambles of sin. The original painting hangs in the chapel of Keble College, Oxford, and a larger replica is now in St. Paul's Cathedral, London.

'SUFFER LITTLE CHILDREN TO COME UNTO ME'



One of the loveliest stories told of Jesus is in St. Mark x, 13-14, 16 ' And they brought young children to Him that He should touch them and His disciples rebuked those that brought them. But when Jesus saw it he was much displeased, and said unto them, Suffer the little children to come unto Me, and forbid them not for of such is the kingdom of God. And He took them up in His arms, put His hands upon them, and blessed them. '

Painting by O. Fogli Pitti Palace Florence photo Allinari

The CHILDREN of ISRAEL-the "Eternal People"



MOSES BRINGING DOWN THE TABLETS OF THE TEN COMMANDMENTS FROM SINAI

Jews. A people scattered over the length and breadth of the earth for almost 19 centuries, and still remaining a distinct race, though mingling with the people of many lands, the Jews have well been called the "eternal people." We cannot speak of the Jews merely as an ancient people as we do of the ancient Assyrians and Babylonians, for they are still a living race, and a vital force in the world today. Though they number only about 15,500,000, or less than one-tenth of 1 per cent of the population of the world, we cannot mention any important field of human activity without finding many Jews among the great names.

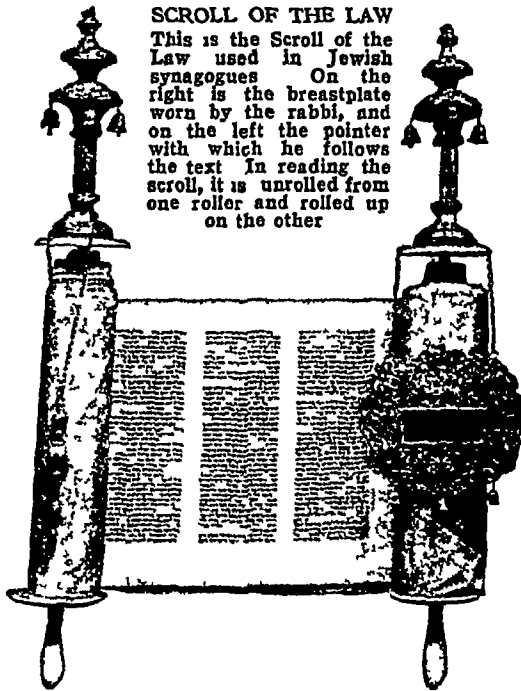
The same intensity of character that made Israel an important nation in ancient times has given the Jews of today distinction in every department of life. For in mental and moral traits, and even in form and feature, the Jew of today is much the same as his forefathers of the days of Solomon and David. No other civilized people has preserved its

racial character almost unchanged for so long a time, no race has endured greater sufferings and misfortunes, and no race in proportion to its size can boast of higher or more lasting achievements and culture.

The history of the Jews begins in a far distant past, when their ancestors were wandering Semitic tribes of the Arabian desert, slowly drifting into Palestine. According to the Bible, the great forefather of the race was Abraham, who, about 2000 B.C., led his people forth from Ur of the Chaldees into Palestine at the Divine call to found a nation dedicated to the service of the one God. Because he came from beyond the Euphrates, Abraham was called "the Hebrew" (from a word meaning to "cross over"). Isaac, who succeeded Abraham as patriarch of the people, had twin sons, Esau and Jacob. Jacob, whose name was changed to Israel, gained the leadership. He was followed by his twelve sons, who became the heads of the twelve tribes known as the Israelites. Esau founded the Edomites. Jacob's

SCROLL OF THE LAW

This is the Scroll of the Law used in Jewish synagogues. On the right is the breastplate worn by the rabbi, and on the left the pointer with which he follows the text. In reading the scroll, it is unrolled from one roller and rolled up on the other.



Esau and Jacob. Jacob, whose name was changed to Israel, gained the leadership. He was followed by his twelve sons, who became the heads of the twelve tribes known as the Israelites. Esau founded the Edomites. Jacob's

fondness for his son Joseph quickly aroused the jealousy of the other brothers, and they secretly sold him as a slave to some merchants on their way to Egypt. But Joseph rose to the position of Prime Minister of Egypt.

After a time, because of famine in Palestine, Jacob and his sons came to Egypt to buy grain. Through Joseph's influence they and their families were given land, and there they remained for generations, enjoying prosperity and greatly increasing in numbers. But in after years, according to the Bible account, the Egyptians became jealous of the Israelites and made them slaves under cruel taskmasters.

From this oppression they were delivered by Moses and led back to Palestine, or Canaan, "the Promised Land," which was then inhabited by a highly civilized Semitic people called the Canaanites. Before this time the Israelites had been a wandering shepherd people, now, under the laws established by Moses and the influence of Canaanite civilization, they gradually grew into a strong nation.

Moses was succeeded by Joshua, who led the Israelites across the river Jordan, taking possession of the land of the Canaanites and dividing it among the tribes. Levi, the priestly tribe (whose members were called Levites), was given no land, for its members were to dwell among the other tribes as religious leaders. Joshua won many victories against the Canaanites, but the Israelites were still sorely harassed by them and other warlike tribes, especially the Moabites, the Ammonites, and the Philistines.

To lead the people during these troublous times, officers known as "judges" were appointed. Among the most famous of these were the warrior Gideon, the woman-judge Deborah, and Samson, who performed marvellous feats of strength. In the time of the prophet Samuel the people decided that they must have a stronger form of government, and demanded a king. For this office Saul was chosen. He united the tribes of Israel into a strong kingdom and won many brilliant victories, but he and his son Jonathan both fell in battle against the Philistines.

David was then proclaimed king, and peace was at length established throughout the land. Under his son Solomon the kingdom reached its greatest prosperity and glory. When Solomon's son Rehoboam ascended the throne the ten northern tribes revolted and made Jeroboam

king. Only Rehoboam's own tribe of Judah, together with the little tribe of Benjamin, remained faithful to the house of David. From that time on (about the 10th century B.C.) the land of the Hebrews was divided into two kingdoms—the northern one being known as Israel, and the southern as Judah.

Feeling was bitter between the two kingdoms and border wars were frequent. Israel was rich and prosperous, its land was fertile, and its people dwelt in towns. But the land of Judah



BLOWING THE RAM'S HORN

To remind the Jewish people of the approach of the Sabbath, the "shofar, or ram's horn" is blown on Friday evenings. This photograph shows a Yemenite Jew of Jerusalem performing the duty. The Yemenites are a Jewish sect which settled down in Arabia, and claim to be descendants of the tribe of Gath. Many of them are now returning to Jerusalem.

Photo: American Colony in Jerusalem

was stony and sterile, Jerusalem was its only large town, and most of its people still clung to their old shepherd ways of life. Religious differences also arose because the town dwellers of the north adopted heathen worship.

Jeroboam forbade his people to worship at the temple in Jerusalem, and introduced idolatrous practices. Under his successors the country

went from bad to worse. Finally, in 722 B C, the Assyrians captured Samaria, the capital, and, driving off the mass of the people into slavery, put an end to the kingdom of Israel. The ten tribes were thus lost to history. Their place was taken by Assyrian colonists, who, mingling and intermarrying with such Israelites as were left, formed the people known as the Samaritans.

The little kingdom of Judah endured for more than a hundred years longer, though its position between the powerful states of Egypt and Assyria exposed it to repeated invasions. For the most part it remained faithful to the ancient religion. Under King Hezekiah Jerusalem was strengthened, and an attack of the Assyrian army under Sennacherib was driven back. King Josiah was slain in a battle with the Egyptians, and Judah was forced to pay tribute to Egypt. The weakened kingdom finally fell a prey to the Chaldeans, who had become the great world power. Jerusalem was captured by Nebuchadnezzar in 586 B C, most of the people were carried away into exile in Babylon, and the once flourishing kingdom of Judah became a wilderness, as the prophets had foretold.

It was now that the word Jew, which originally meant an inhabitant of Judea, was applied to all the members of the Hebrew race.

The Return to Jerusalem

After about 70 years the Chaldean Empire was overthrown by the Persian king Cyrus, who permitted the Jews who so desired to return to Jerusalem and rebuild the temple. Later Ezra the Scribe led another band back to Jerusalem, and brought about a great religious awakening. A few years later Nehemiah, a Jew, was appointed governor of Judea, and in this position was able to do much for his people. During this period the writings contained in the Hebrew Bible were collected and arranged.

After the conquests of Alexander and his death (323 B C), the Ptolemies of Egypt ruled Judea for about a hundred years, and then it fell into the hands of Syria. The Syrian king Antiochus Epiphanes outraged the feelings of the Jews by setting up idols and ordering the people to worship them. The aged priest Mattathias then raised the flag of revolt, and under the leadership of his five sons, known as the Maccabees, the Jews defeated the Syrian army, and won their independence (130 B C).

Before long, however, the people became divided into parties, or sects, such as the Pharisees and the Sadducees. A dispute arose between two claimants to the throne, and Rome, with whom an alliance had been formed, was called upon to act as arbiter. The Roman general Pompey took advantage of the situation to make himself master of Jerusalem and force the Jews to pay tribute. When Julius Caesar came into power he placed a foreign ruler,

Antipater the Idumean, over Judea. Antipater's son and grandson ruled from 37 B C to A D 39. Under the Roman governors who followed there were frequent insurrections, culminating in the great Jewish war of A D 66. After a long siege the Roman general Titus, afterwards emperor, took Jerusalem in A D 70, burned the temple, massacred thousands of Jews, and enslaved thousands of others.

The Nation Scattered Abroad

The Jewish nation was destroyed, but not their spirit. Dispersed throughout the world, they established synagogues wherever they went, and their rabbis, or masters, continued the teaching of the law. The very fact that they were dwelling among strangers made them cling with greater tenacity to the very letter of this law, following it in every detail of their lives. Even their food must be *kosher*, that is, "clean" according to the Mosaic law.

But it was only at the cost of terrible suffering that the Jews remained faithful to their religion. Their history, from the time of the dispersion until recent times, is, for the most part, a long succession of persecutions. In many places they were forced to live in crowded quarters called *ghettos* and compelled to wear a distinguishing dress. They were not allowed to own land. Trading and money-lending were the only pursuits open to them. The shrewdness which many of them developed became a reproach to the whole race. For a long time they were deprived of political and educational privileges in most European countries, and were exposed to the violence of mobs that time and again rose against them, massacring men, women, and children. Wherever little Jewish colonies existed, in fact, the fear of a sudden outburst of hostile feeling hung over them. In Russia the Jews were forced to live in a restricted area called the "Pale of Settlement." They were originally admitted by Peter the Great, but were expelled by the Empress Elizabeth in 1743. Catherine II again allowed them to enter, and Alexander I also extended his protection to them.

Jewry in Modern Times

In many countries, Jews today enjoy equal rights with other citizens, although a violent outburst against the race broke out in Germany in 1933, and many fled the country, in other countries, too, an intensely national spirit sooner or later tends usually to turn its activities to persecution of the Jews.

The persecutions which the Jews have suffered caused many of them to look with longing eyes at their former home in Palestine, and to hope that the Jewish state might be restored in the Promised Land. Out of this desire and hope has grown the Zionist movement. It is, of course, impossible to bring all the 15,500,000 Jewish people back to Palestine, and the

majority are content to dwell in their present homes But it is the purpose of the Zionists to provide a home for the oppressed Jews in Palestine (q v)

It would be impossible to name all the Jews who have won distinction in modern times In England, Disraeli rose to the position of Prime Minister, and Rufus Isaacs, later Marquess of Reading, became Viceroy of India Lord Samuel, philosopher-statesman, is a Jew, and another present day Jewish minister is Leslie Hore Belisha In Germany we find such great leaders of the people as Ferdinand Lassalle and Karl Marx, in France, Gambetta, the famous statesman, and in Russia, Trotsky

From ancient times Jews have shown their ability as scholars, scientists, and philosophers The name of Albert Einstein will go down to posterity as one of the greatest physicists known to science Henri Bergson and Felix Adler, as leaders of thought, may be counted among the successors of Spinoza and Moses Mendelssohn, while Heinrich Hertz has won fame through his discoveries in electricity and magnetism

Among countless Jewish writers are the poet Heine, one of the greatest lyric geniuses of the 19th century, Berthold Auerbach, the novelist, and Ludwig Fulda, the dramatist, both prominent among German writers, Israel Zangwill, writer of plays and stories of Jewish life, and the critic, Georg Brandes

In music the Hebrew race has shown special genius The composers Felix Mendelssohn, Meyerbeer, and Offenbach, the pianist Rubinstein, and the violinist Joachim are immortal names, while Mischa Elman and Jascha Heifetz are celebrated names of more recent times Among great Jewish actors and actresses are Rachel, Bernhardt, Nazimova, and Moscovitch There have been, curiously enough, some famous Jewish boxers, but it is in the history of money and finance that we find the greatest number of noted Jewish names, of which Rothschild is most famous of all

Jinn. The Mahomedans believe that there is a race of spirits or supernatural beings ranking between men and angels, called jinn or genii ("Genie" is the singular of "genu," and "jinnies" is sometimes used as the singular of "jinn") Jinn appear either as very ugly or very beautiful men or women, or else in the form of

animals They are supposed to have been made out of smokeless fire long before Adam was created, and to have dwelt in desert places, lurking near Heaven to learn its secrets The Koran, the sacred book of the Mahomedans, says that there are good jinn and bad jinn

If once you knew the right way to manage them, the jinn became your willing slaves and would do everything they possibly could for you Magicians always had jinn to help them



KING DAVID DRIVEN FROM ZION

One of the bitter incidents in the life of King David was the revolt against him of his third son Absalom, after they had been fully reconciled. David was forced to flee from Jerusalem, and here a Biblical illustrator, G. Rochegrosse, shows the stricken king passing over Jordan to take refuge in Mahanaim. *Newtonian Illustrated Press Service*

In the Arabian tales jinn often appear as slaves of people who hold some power over them When you read the famous "Arabian Nights" (q v) you find many stories about jinn A very well-known jinn mentioned there is the one that appeared whenever Aladdin rubbed his wonderful lamp or the magic ring You will remember that when Aladdin was imprisoned in the dark cave by the stranger who claimed to be his uncle, a jinn appeared

SAINT & SOLDIER—MAID OF ORLEANS

People will never grow tired of disputing the truth of Joan of Arc's claim to have heard the voices of angels But there is no dispute about her courage and achievements as a fighter for France

Joan of Arc. (1412-1431) This is the immortal story of Joan of Arc—Jeanne d'Arc, as the French call her—the girl heroine who saved France from conquest in the first half of the 15th century Her home was at Domrémy, in the valley of the river Meuse, in north

eastern France, and her father, Jacques d'Arc, was a well-to-do peasant proprietor, owning a farm on the outskirts of the village His daughter never worked in the fields, but helped her mother in the home with the spinning, weaving, and other household duties

Energetic, good-tempered, and kind-hearted, Joan was a general favourite in the village But often her heart was troubled by what she heard of the sad plight of her beloved land For many long years it had been wasted with war, and now the whole northern half was in the hands of the English and their ally, the Duke of Burgundy Its young prince, Charles VII—called the Dauphin because he had not yet been crowned king at Reims—was without money, armies or competent generals, and moreover, expected shortly to lose that part of France which still remained in his hands

When Joan was thirteen, she became devoutly religious Loving quiet and solitude for meditation, she often took the dog and watched her father's little flock of sheep, while she worked an altar cloth with the exquisite embroidery which, afterwards, was to occupy her dark days in prison

On the breezy hillside, in the orchard, and as she knelt before an image of the Virgin in the village church, Joan began to hear heavenly voices and to see visions—of Saints Margaret and Catherine, and of the archangel Michael, patron saint of the soldiers Their message was that she should go to the Dauphin, lead his troops to victory, and free France of the invaders Her sorrowful family and the village priest tried to dissuade her, thinking her distracted, but she was determined to obey the voices And such is the power of consecration that she overcame the opposition of officials, bishops, and nobles, reached the Dauphin, and won his belief in her mission Now, clothed in shining armour,



JOAN RECEIVES THE SWORD OF ST MICHAEL

This picture, from a French painting, illustrates the story that Joan of Arc received a sword from the Archangel Michael, with the message that she should lead the French troops to victory and free France of its invaders

COUNTRY GIRL WHO LED A KING TO VICTORY



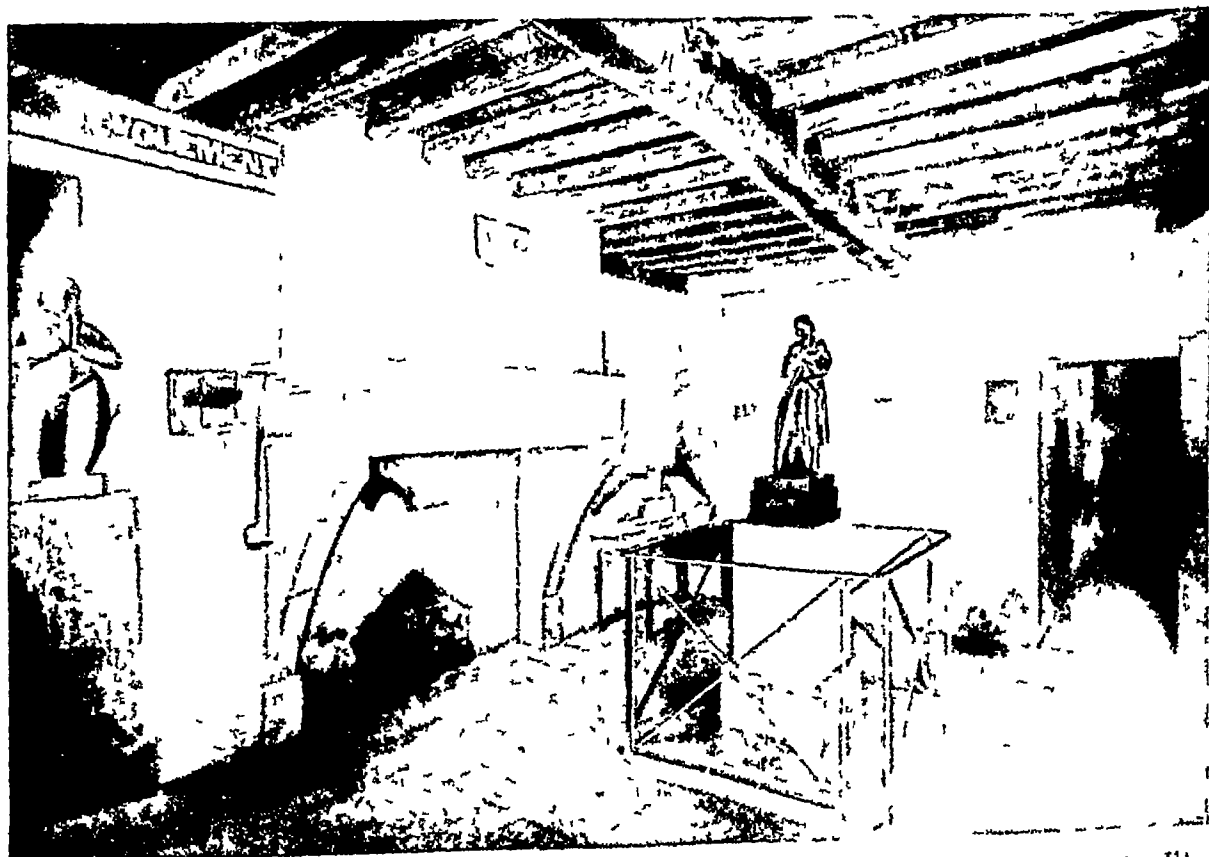
Joan of Arc, whom the whole world honours as one of the greatest women of all time, was a simple peasant girl born and bred in a little French village. At that time a great part of France was in the hands of the English and it was to expel them that she felt her call. After many difficulties she was given her opportunity. Clad in armour she placed herself at the head of the French army, and raised the siege of Orleans. Joan was afterwards taken prisoner and burned as a witch, but not until she had fulfilled her ambition and seen Charles VII crowned at Reims.

Painted specially for this work by DUDLEY TENNANT

MEMORIALS TO JOAN OF ARC

JOAN OF ARC was born at Domremy, a village of Eastern France, in the department of Vosges, it is now known as Domremy la Pucelle (la Pucelle being French for the maid)

Domremy's present population is only a little over 250, but every year thousands of sightseers make pilgrimages there to see the house in which Joan was born in 1412, the actual room is shown below. Over the door are the Royal Arms of France and the inscription "Vive Labour- Vive le Roi Louis" (Long live work long live King Louis). It is a very humble house judged by our modern standards for Joan's parents were but simple peasant farmers who never in their wildest dreams saw Joan regaining the throne for her king and leaving a name that is one of the most illustrious in history. In the centre of the room in which she was born is a statuette of the Maid. The statue of Joan on the right, the work of Princess Marie of Orleans, stands outside the Town Hall of Orleans.



HOW THE MAIDEN WARRIOR SAVED ORLEANS



This stirring painting by Lenepveu depicts the scene which marked in May 1429 the turning point of the Hundred Years War. Joan of Arc, holding high her white banner embroidered with the lilies of France, is leading the men of Orleans against the English, who were in possession of the forts that commanded the city of Orleans. Joan's standard was looked upon as an omen of victory. 'When it touches the walls, she had said, we shall surely enter.' And so it was. The English were driven from the forts and Orleans was again free after a seven months' siege.

JOAN OF ARC

and with the golden-lit banner of France waving above her head, she led an enthusiastic army to the relief of the walled city of Orleans, which the English at that time were besieging. Cutting boldly through the enemy, she entered the city. In four days of masterly sallies and attacks she sent the enemy flying. This was in May, 1429, when she was not yet 17. In July Joan was able to conduct the Dauphin in triumph to Reims Cathedral for coronation at the altar where the kings of France were always crowned.

Joan now regarded her mission as finished, and begged permission to return to her home. She declared her unfit to remain at the head of the army, since her heavenly "voices" had deserted her. The king, however, persuaded her to remain, and she marched to drive away the Burgundians who were besieging Compiègne. Here she was defeated, taken prisoner, and sold as a prize of war to the English. For months she was kept in a gloomy prison in the Norman city of Rouen, and was subjected to shameful indignities and a long trial.

Delivered to her enemies, and abandoned to her fate by an ungrateful king and courtiers, she defended herself in her trial with great skill and courage. In the end she was convicted of witchcraft and heresy, and was burned at the stake in May, 1431. On May 16, 1920, nearly 500 years later, she was canonized, i.e. enrolled in the list of Catholic saints. The immortal deeds and piteous death of "the Maid of Orleans" have inspired sculptors, painters, and poets for five centuries—G. B. Shaw's "St Joan" is one of the great plays of the post-War era—while to France she has been for long the nation's best-loved heroine.

Job. The most sublime treatment of the great mystery of human suffering is given in the Book of Job in the Bible. In dignity and

JOFFRE

beauty of phrase the prose of the prologue and epilogue must for ever rank among the masterpieces of literary composition.

The hero is a wealthy chieftain of Uz, some where between Palestine and the Euphrates, who is noted as a God-fearing and upright man. But to test whether his righteousness will remain strong in suffering as in prosperity, God allows Satan to inflict upon Job a series of the most terrible misfortunes and afflictions.

His friends tell him that this suffering has come through sin. But Job refuses to believe it is punishment for wrong-doing, he cries out to God for some other explanation. Filled with pain and doubt as Job is, he still has not lost his faith in God. "I know that my Redeemer liveth," he says, and at last God, speaking out of the whirlwind, answers him. Job bows in submission, realizing that the great mysteries of life are beyond Man's understanding.

Joffre, JOSEPH JACQUES CESAIRE (Pron zho'-fr) (1852-1931) One of the most beloved French Commanders-in-Chief was "Papa" Joffre, "the Victor of the Marne," who halted the overwhelming rush of the German armies in 1914 and saved Paris and France. Marshal Joffre was of very humble origin, his father being a maker of wine casks in the extreme southern



'PAPA' JOFFRE, HERO OF THE MARNE

This is the great simple-hearted citizen of France whose patience, courage, and skill achieved the glorious victory on the Marne. The soldiers who won this battle for him gave him the affectionate nickname "Papa," to express their appreciation of his paternal care for them and their trust in him.

part of France. The boy was sent to the famous École Polytechnique in Paris, where he prepared himself for a military career. But before he had finished his education he was called to arms in the Franco-Prussian War of 1870-71, and at the end of the disastrous siege of Paris he saw the victorious Germans march into his beloved city.

The young soldier never forgot that scene, and he spent the next 40 years in making himself and France ready, should the Prussian foe strike again. Joffre saw many years of service in the French colonies in Africa and Asia.

When the World War broke out in 1914, Joffre was made commander of all the French forces on the Western front. In the face of the crushing onslaught of the German army through Belgium, he ordered his troops to retire mile after mile into France. Then the clarion call went forth (September 6, 1914) "Soldiers, we are attacking. Advance as long as you can. When you can no longer advance, hold your position. When you can no longer hold it, die!" The result was the victory of the Marne.

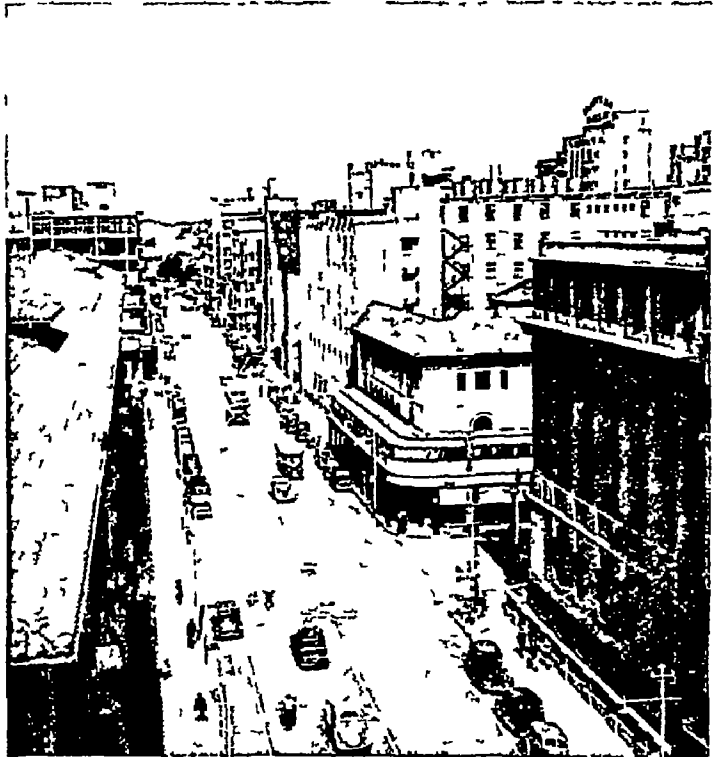
Created a Marshal of France, Joffre was removed from the active supreme command in 1916 as the result of the necessity of trying other tactics and other men in the supreme task of defeating the German armies.

Johannesburg, SOUTH AFRICA

Few cities have developed so rapidly, so majestically, and in so orderly a fashion as this "City of Gold" on the African veld. Fifty years ago peaceful Boer farms occupied what today is the most thriving hive of industry in the Dark Continent. Situated 5,735 ft above sea level on the famous Witwatersrand ("Ridge of White Waters"), which produces one-half of the world's yield of gold each year, Johannesburg is a city literally "born with a gold spoon in its mouth." Mining engineers have determined the existence of a gold "reef" 61 miles long and, apparently, limited in depth only by Man's ability to reach the deepest levels.

Johannesburg has broad straight streets covering 82 square miles, many handsome public, business, and private buildings, and delightful suburbs. These lie, in general, to the north and east of the city, while the mining area is in the south. It is the largest commercial and industrial city in South Africa.

Of its buildings, among the most attractive are the Town Hall and Municipal Buildings, which were opened in 1915 and cost about



STREET IN BUSY JOHANNESBURG

It is difficult to realize that a city like 'Joburg' as Johannesburg is popularly called, could spring up where formerly only pasture lands extended, in one man's lifetime. Yet it was only in 1886 that the city was founded during the first great "gold-rush." This street (De Villiers Street) and many like it throughout the city, are thus the creation of fifty years.

Photo: South African Railways and Harbours

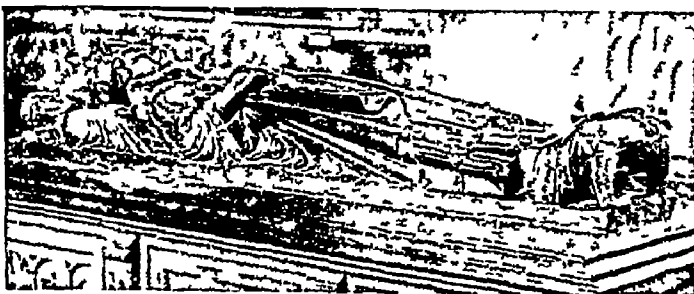
£450,000, the University of the Witwatersrand, the Municipal Art Gallery, the Law Courts, and the Post Office, which has a 200 ft frontage and a clock tower 106 feet high.

Founded late in 1886 and named after Johannes Rissik (then surveyor-general of the Transvaal), following the discovery of the Rand gold reef in the previous year by a mason employed by a Dutch farmer, Johannesburg has grown with astonishing speed. At first a part of the independent Boer Republic of the Transvaal, after the Boer War (1899-1902) it became a Crown Colony under the British flag, and later, in 1910, a part of the Union of South Africa. An Empire Exhibition was held

at Johannesburg in 1936 to mark the city's jubilee. Its population is about 519,000, of whom many more than half are whites.

John, KING OF ENGLAND (1167-1216). Vicious, shameless, and ungrateful, King John holds the title of the worst English king.

He was nicknamed "Lackland" because his father, King Henry II, gave him no possessions on the Continent, although all his elder brothers had received such grants. Later he was endowed with castles, lands, and



WICKED KING JOHN

This is the effigy of King John that surmounts his tomb in Worcester Cathedral. Even at his death no one had a good word to say for him for his reign marks one of the least honourable periods of our nation's history.

revenues on both sides of the Channel John showed his characteristic ingratitude and spite by joining his brother Richard the Lion-Hearted in conspiring against their father, and it was the discovery of this treason that brought the old king to his grave When Richard became king he confirmed John in his possessions and added others, but John, in turn, conspired against Richard during the latter's absence on the Third Crusade

On Richard's death in 1199 the barons chose John to be king, despite the claim of his nephew Arthur, the son of another brother, Geoffrey, who had died some time before Two French provinces took up arms in young Arthur's support, but he himself fell into the king's hands and was murdered by John's commands In a war with the king of France, John lost all his French possessions except Aquitaine

Then came a quarrel with Pope Innocent III over the nomination of Stephen Langton as Archbishop of Canterbury John's resistance was broken at last by the Pope's threat to depose him and by the growing disaffection of his subjects He not only received Langton as archbishop, but he abjectly agreed to hold England as a fief from the Pope and to pay a yearly tribute While John was absent on the Continent, seeking to regain his forfeited fief of Normandy, the barons of England united to resist the tyrant's rule John met the barons at Runnymede on June 15, 1215, and put the royal seal upon the Great Charter (*See Magna Carta*)

But John had no intention of abiding by his grant He raised an army and harried with fire and sword the estates of the barons, who in despair offered the crown to Louis, son of the French king Louis landed with a great army, and received the submission of a large part of England But while the issue was still doubtful, John died suddenly of a fever at Newark

Johns, CHARLES ALEXANDER (1811-1874) If you are interested in flowers or trees, you are sure, sooner or later, to come across the books of this naturalist For though they are now out of date, and superseded by newer, more accurate

works, they will always remain as classics in the literature of their subjects Their author, too, provides an example of that typically English school of Nature-writers who found "world enough and time" in the country parsonage or on a short excursion on holiday from business to make observations on which many notable books and reputations were founded

Few can have led a much less interesting life than Charles Alexander Johns—a West Country schoolmaster He entered the Church in 1841, but became a schoolmaster, first at Holston, where one of his pupils was the great novelist and poet, Charles Kingsley, whom Johns inspired with his own love of Nature, more particularly of botany Next he moved to Winchester, where he opened his own private school, Winton House There he remained until his death on June 28, 1874

Yet life held nobler and richer things for Johns than the problems of teaching and feeding his youthful charges His mind was uplifted by the beauties and awed by the wonder of Nature wherever he turned In the restrained style of his books the mind of the true Nature-lover can always be seen at work Read them for yourself—there are plenty to choose from "Flowers of the Field" (a classic of botany), "Forest Trees of Britain", "Rambles in the Country", "First Steps to Botany", "Birds' Nests", "Birds of the Wood and Field", and "Sea Weeds"



AMY JOHNSON

'Amy' first flew into fame with her solo flight to Australia in 1930, since then, she has broken record after record in the air Above is the famous airwoman at the controls of her Puss Moth in November, 1932, before taking off for the Cape, which she reached in 4 days 6 hours

Johnson, Amy (born 1904) On May 5, 1930, a young woman, who had started flying only eighteen months before, stepped quietly into a little second-hand aeroplane, called Jason, at Croydon Aerodrome, and started on a solo flight to Australia

After having taken her degree of Bachelor of Arts at Sheffield University, Miss Amy Johnson found teaching and secretarial work rather too slow and monotonous, so took up flying, being the first Englishwoman to gain a ground engineer's licence She then decided that she would attempt to beat the record of Bert Hinkler, who in 1928 had flown from England to Australia in 15½ days In that she was not successful, but she reached Port Darwin in

JOHNSON

nineteen and a half days—a most remarkable achievement in the circumstances, and one which immediately brought her world-wide fame. She received the hearty congratulations of the King and Queen on “her wonderful and courageous achievement,” and was made a Commander of the Order of the British Empire.

The daring aviator was well ahead of the record until she reached Rangoon, where she missed her way, and had to make a forced landing. Her little Moth plane toppled into a ditch, and she was compelled to wait until the damage to the machine was repaired. Afterwards she encountered gales and tropical rain, which forced her aeroplane so low when crossing the shark-infested Java Sea that it almost touched the waves. Then she had to climb over cloud-capped mountains before she sighted the Timor Sea. At last, on the afternoon of May 24, Jason was brought to rest on Australian soil and Miss Johnson had completed the first woman's solo flight from England to the Antipodes, over 10,000 miles.

In the following year, Amy flew to Japan and back with a companion, and in 1932 from England to Cape Town alone in 4 days 6 hours, and in 1936 again made a there-and-back flight in just under eleven days, beating the record in each direction. Miss Johnson married the famous pilot J. A. Mollison in 1932, and crossed the Atlantic with him in July, 1933.

Johnson, Samuel (1709-1784) The unique position which Samuel Johnson held among English men of letters and scholars of discernment was due as much to intellectual integrity as to wide erudition; his was in large measure a triumph of vigorous and upright personality. In the words of Lord Brougham, “Johnson was a good as he was a great man, and he had so firm a regard for virtue that he wisely set much greater store by his worth than by his fame.”

As a boy in Lichfield, where he was born, Johnson gave early promise of the powers of mind which were one day to make him the literary dictator of his times. He “gorged” the books in his father's bookshop.

The days of his early manhood, however, were filled with

disappointment and failure. His father lost most of his money, and the son found that the family poverty made it impossible for him to continue his studies at Oxford and take his degree. He fell in love and married, at the age of 26, Mrs. Porter, a widow 20 years older than himself, who died in 1752. With the aid of his wife's small fortune Johnson set up a school for young gentlemen near Lichfield. But the school failed after a year or two, and Johnson set off for London to seek his fortune. With him went David Garrick, his favourite pupil.

The early days in London were so full of hardship that years later Johnson is said to have burst into tears on recalling them. He wrote Parliamentary reports in the disguised manner which was usual before verbatim



JOHNSON AND GOLDSMITH

The big man taking snuff is the great Doctor Johnson, and walking beside him is his friend, Oliver Goldsmith. When the Doctor wrote, his style was big and heavy, like the man himself, and Goldsmith once said to him: “Doctor Johnson, if you could make little fishes talk, they would talk like whales.”

reports were allowed, taking care, as he frankly said, "that the Whig dogs should not have the best of it" He made translations for the press. He made catalogues for booksellers, one of whom he knocked down for reproving him for negligence.

Hard worker as Johnson was he barely made a living for himself and his wife. Often he walked the streets at night for the want of a few pence for a lodging. But even in those pinching times he would put pennies into the hands of poor little children sleeping in the streets.

Gradually Johnson's reputation grew, he became well-known to the publishers and booksellers of London. One, Robert Dodsley,



WHERE JOHNSON WAS BORN

In this house at the corner of Market Street, Lichfield, Dr Johnson was born on September 18, 1709, in a room above his father's bookshop. The house is now a Johnson museum.

suggested that an English dictionary would be well received by the public. Johnson had already dreamed of such a work, and when a combination of booksellers offered him a considerable sum for the undertaking, he accepted.

But when one considers that the "Dictionary" took almost eight years to complete, and that Johnson had to pay his assistants out of his own pocket, one can see that he was not yet free from money worries. Nowadays Johnson's "Dictionary" seems old-fashioned and unscientific, it was, however, far better than those which preceded it, and paved the way for the better ones which we have today.

Dr Johnson often permitted his own experience and his own intense prejudices to colour the definitions he wrote. Here is an example.

Lexicographer A writer of dictionaries, a harmless drudge, that busies himself in tracing the original, and detailing the signification of words.

The "Dictionary" brought Johnson such fame that the University of Oxford conferred upon him the degree of "Doctor of Laws" (LL.D.). But it did not bring him much relief from poverty. In the 18th century men were often given pensions in recognition of literary work or as a mark of political favour. In 1762 the government decided to bestow a pension of £300 a year upon Dr Johnson. The author of the "Dictionary" was rather hesitant about accepting the money. Had he not defined "pension" in his own pages as "pay given to a state hireling for treason to his country"? Had he not defined patriotism as "the last refuge of a scoundrel"? The Prime Minister, Lord Bute, reassured him, saying the money was given him for what he had done, not for what he was to do.

When Johnson had first come to London he had found dinners for sixpence, and coffee houses where by paying threepence he spent long hours talking to his friends. Good company and good dinners he loved more than anything on earth. "I look upon a day as lost," said he, "in which I do not make a new acquaintance." He ate enormously of such dishes as



DR JOHNSON SLIGHTED

During his early struggles Dr Johnson sought the patronage of Lord Chesterfield, but was left neglected in the anteroom, as shown here. When success came, Chesterfield offered his patronage, which Johnson refused in a stinging letter.

From the painting by F. M. Ward

roast pork or real pie stuffed with plums and sugar. His tea-pot held two quarts—as well it might, for he boasted of having drunk 25 cups at a sitting. To take dinner with Dr. Johnson in one of the London taverns, and to hear his brilliant, witty table-talk was considered a great distinction, marking the recipient as a person of intelligence, for it was well known that the great literary “lion” did not tolerate fools or bores gladly.

Thus grew up his famous Literary Club, which included Garrick the great actor, Reynolds the artist, Gibbon the historian, Sheridan the playwright and politician, Goldsmith the man of letters, Burke the statesman and others. There were women, too, who enjoyed an evening of conversation with the great man. They could hear him talk at the home at Streatham of Henry Thrale, a wealthy brewer, who was always a generous friend to him. There he met “little Burney” (Fanny Burley) who wrote “Evelina,” and there he formed the friendship with Mrs. Thrale.

In 1763 James Boswell, a young Scots lawyer, met Dr. Johnson and became his admirer and friend. No words of his idol escaped him. He put them all down on paper, and published them for the world to read after Johnson's death. And they are well worth reading. We hear him say: “Being in a ship is like being in jail with the chance of drowning,” which is as simple as one could make it. We see him as the tender-hearted friend, the generous almsgiver, for in the last years of his life he used his pension mainly for the poor. We see his sturdy independence of thought and his stubborn pre-

judices. Boswell records such gems as: “While you are considering which of two things you should teach your child first, another boy has learned them both,” “Life is a pill which none of us can bear to swallow without gulping,” and “It is better to live rich than to die rich.” Boswell's “Life” will preserve for all time the picture of this strange, uncouth, great-hearted man—so eccentric that some were afraid of him, so learned and brilliant in his talk that the proudest and best were glad to gather at his feet.

In addition to his Dictionary (1748–1755), Johnson wrote a novel, “Rasselas” (1759), a play, “Irene” (1737), some poems, and essays in the “Rambler” and “Idler.” (See Boswell, J.)

Jones, Inigo (1573–1652). In the pages of this book you will meet plenty of great painters, sculptors, and other artists. Yet of architects, there are few whose names really

survive their works, and among these in England one of the greatest is Inigo Jones. Born in London, July 15, 1573, he attracted as a young man the attention of a wealthy patron who provided him with the means for a European tour. After visiting Venice, where he studied the work of Palladio, and Copenhagen, where he is said to have designed two royal palaces, he returned home in 1604, and was employed by the Prince of Wales as architect and designer for the court masques. He visited Italy again, 1612–13, and in 1615 was appointed surveyor-general. He designed the Queen's House at Greenwich in 1617, and in 1619 the Banqueting House at Whitehall.

His other principal works were the water-front of old Somerset House, Ashburnham House, Westminster, Wilton House, and Amesbury Abbey, Wilts, executed from his designs by his pupil, John Webb. Jones was the first to introduce the Palladian style into England.



INIGO JONES

This great architect's contribution to English architecture was the Palladian style, an adaptation of the Greek. Portrait by Van Dyck.

in this style, the dignity and solidity of the finer classical architecture were combined by him with the direct, simple and more typically English manner. In the Civil War he was taken prisoner by the Roundheads, and was heavily fined. He returned to his profession in 1646. He died, like so many great men, in a state of poverty, July 5, 1652. As a designer of masques he had as rival Ben Jonson, who refers to him in several satires, even in his day you see, architects were working at theatrical design. **Jones, John Paul** (1747–1792). This American naval hero was born at Kirkcubright, Kirkcubrightshire, July 6, 1747, and went to sea at the age of twelve.

He soon rose to be skipper of a Whitehaven slaver, but in 1775, having killed his chief officer, he joined the American navy. That he was a born fighter is shown by his famous expression: “I do not wish to have command of any ship that does not sail fast, for I intend to go in harm's way.”

In 1777 his exploits around the coast of Britain gained him fame as a daring commander. He destroyed the fort at Whitehaven, and captured the English frigate Drake. Returning to France, then an ally of America, he asked for, and finally received, a naval vessel which he named the *Bonhomme Richard* in compliment to Franklin, the American minister to France, whose “Poor Richard's Almanac” was very popular at the time. With this vessel Jones fought the famous naval duel with the *Serapis* on September 23, 1779.



'O RARE BEN JONSON'

After Shakespeare and Marlowe, Ben Jonson ranks as the greatest of the Elizabethan dramatists. His plays, however, brought him no great monetary reward, and he died in poverty.

As a scholar he towered far above the rank and file
After Gerard Monihorat

After several hours of such fighting as had rarely been seen on the seas, the English commander called upon Jones to surrender, but although his ship was sinking, that intrepid commander responded "I have not yet begun to fight," and in a short time he actually compelled the English ship to surrender to him.

Jones died in Paris, July 18, 1792. He was buried in a little Protestant cemetery in that city, but in 1905 his body was taken to America and interred at the United States Naval Academy at Annapolis.

The name of Paul Jones is perpetuated in the dance introduced into England by American sailors at the end of the World War.

Jonson, BEN (1573? -1637) To have been a bricklayer at the building of Lincoln's Inn, and to be buried in Westminster Abbey under a slab bearing the words "O rare Ben Jonson," are incidents showing that here was an exceptional man.

It is true that even as a bricklayer with a trowel in his hand "he had a book in his pocket," but it was neither study nor learning which made Jonson famous, but his amazing personality. He had run away from home as a lad, led a hard life in times of war as a private in the army, been in prison, killed a rival actor in a duel, yet, later in life, he became one of the most famous poets, dramatists, and wits of his time, and the bosom friend of Shakespeare.

He wrote the comedy, still regarded as a masterpiece, "Every Man in his Humour," in which Shakespeare himself took a part at its first performance. In 1603 Shakespeare's own company performed Jonson's first tragedy "Sejanus," at the Globe Theatre, London.

For years Ben Jonson's pen produced comedies, masques, dramas, tragedies, poems and songs (who does not know "Drink to Me Only with Thine Eyes"?), as well as prose works. He was, moreover, one of the social idols of his day, and one of the leaders of the convivial clubs which were such a feature of London tavern life in the 17th century. One of his favourite resorts was the Mermaid Club in the Mermaid Tavern, in Cheapside, London, where he impressed younger writers with something of the power which Dr Samuel Johnson was to exercise over a later generation. Here Shakespeare, Jonson, Beaumont, Fletcher, and other great literary men forgathered.

At one period Ben Jonson's satire on the Scots gave such offence that James I and his favourite courtiers had him thrown into prison and condemned to lose his nose and his ears as a libeller. Powerful friends got him out of this scrape, and he himself contrived so well to reinstate himself in favour that he ultimately became Poet Laureate and was granted a State pension of £200 a year.

He was not the equal of Shakespeare, since he lacked the humanity of his great contemporary, but his position in English literature is assured.

Joseph. The story of Joseph in the Old Testament is one of the masterpieces of all literature. The patriarch Jacob gave Joseph, first-born son of his favourite wife,



JOSEPH AND BENJAMIN

A great French artist, J. James Tissot, spent years in Palestine studying Eastern types before he painted his religious pictures. Here he pictures Joseph in the wig and girdled skirt worn by Egyptians of the time.

JOSEPH

Rachel, a "coat of many colours" as a token that Joseph should succeed him as chief of the tribe of Israel. Jealousy flamed among the ten older brothers, and as Joseph tended his sheep at Dothan in the land of Canaan, his brothers sold him to Ishmaelite traders, who carried him into slavery in Egypt. The brothers dipped the coat in the blood of a kid, and Jacob cried when he saw it "An evil beast hath devoured him!" Potiphar, an officer of Egypt's Pharaoh, bought Joseph, and made him master of his household. Potiphar's wife, by false charges, caused him to be cast into prison, but Pharaoh made him his Prime Minister when Joseph interpreted his dreams to mean that Egypt faced seven years of plenty and then seven years of famine. In the years of plenty Joseph stored up great quantities of grain. In the years of famine Joseph's ten elder brothers and Benjamin, younger than Joseph, went to Egypt to buy grain, and Joseph eventually installed his father and Jacob's whole tribe in Egypt.

Josephine, MARIE ROSE, EMPRESS OF THE FRENCH (1763-1814) The proudest monument in Martinique in the French West Indies

JOSEPHINE

is the statue of a woman. It is that of Josephine, daughter of Joseph Tascher de la Pagerie, a native of Martinique, who was raised by her second husband, Napoleon Bonaparte, to the position of Empress of the French.

When, as Madame de Beauharnais, a widow with two children, she married Bonaparte, he was an unprepossessing and little known artillery officer. She gave him a social acquaintance he had not had before, for she was a conspicuous figure in Parisian society. By cleverly pretending to hold republican principles, she had barely escaped the guillotine on which her first husband General Beauharnais, had perished during the Reign of Terror. Thereafter she had made her way by use of her wits and charm. It was with reluctance that she had been induced to marry the rising young commander, who was then desperately in love with her. Within ten years he had made her Empress of the French, a position for which she was fitted by the charm and graciousness which concealed a limited education.

Napoleon's love, however, cooled. In 1809, in spite of her tears and entreaties, she was forced to consent to a divorce. Napoleon wished to secure an heir to his throne and to ally him



JOSEPHINE CROWNED EMPRESS BY NAPOLEON

Josephine, who was born in Martinique on June 24, 1763, married Napoleon I in 1796, two years after her first husband had died by the guillotine. This painting depicts Napoleon crowning Josephine Empress of the French in 1804. Five years later Napoleon divorced her, and Josephine lived in retirement until her death in 1814.

From the painting by J. L. David in the Louvre photo Alinari

self with the royal families of Europe, and soon afterwards he married Marie Louise of Austria. After the divorce Josephine lived at La Malmaison, near Paris, where she died May 24, 1814.

Josephine's two children by her first marriage were Eugene and Hortense. Eugene proved an able and loyal general under Napoleon, and was for a time viceroy of Italy. Hortense married Napoleon's brother, Louis, King of Holland, and became the mother of Napoleon III (*qv*).

Joule, JAMES PRESCOTT (1818-1889) The science of heat, as we know it today, was established by three men: Count Rumford, Sir Humphry Davy, and James Joule, the Manchester physicist. And, for practical purposes, the work of Joule had the greatest bearing on the utilization of heat for mechanical power.

Born at Salford, December 24, 1818, Joule studied under the great John Dalton (*qv*), founder of the atomic theory. Later, he investigated the phenomena of magnetism and electricity, and it was in the course of experiments to find a method of measuring electricity that Joule in 1843 first ascertained the mechanical equivalent of heat. For forty years he studied and experimented on the problem of translating heat energy into terms of mechanical work. What is now known as Joule's Law, is based on this work and states that the heat required to raise one pound of water 1° Fahrenheit is equivalent to the mechanical force needed to raise 778 lb through a distance of one foot (*See Heat*).

Joule received many honours, being elected F R S in 1850 and receiving in 1860 the Copley medal of the Royal Society. He collaborated with Lord Kelvin (*qv*) in many researches into the thermal changes in gases under pressure and temperature changes following compression and extension of solids. It was then that Joule realized the value of surface condensation in increasing the efficiency of steam-engines. The Royal Society supplied him with money to pursue his investigations, and the result was the invention of condensers, the most important advance in marine steam-engines then known. He died October 11, 1889. The joule, the unit of electrical energy, is named after him.

Journalism. Journalism, as its name implies—it is derived through the French from the Late Latin *diurnalis*, which means "daily"—deals with daily occurrences, with the things that are actually going on in every quarter of the globe. A journalist writes in lively, popular style suited to the reader who wants to become acquainted with the day's news in the shortest time and with the minimum of trouble. Writing as he does chiefly for newspapers, he has no time to polish his phrases or to choose the word that is exactly right. He is always writing with his eyes on the clock, and he knows full well that, generally speaking,

what he has written will be thrown into the wastepaper basket after it has been once read.

This is not to say that journalists have no concern for grammar. Many journalists, indeed, are accomplished stylists. Though they write quickly they write well. A newspaper report of some great happening is often a miracle of compression. All the important facts are given without any useless padding. Furthermore, many leading articles in such papers as "The Times," "The Daily Telegraph and Morning Post," "The Manchester Guardian," and "The Yorkshire Post," are literature, except that they are written for the moment and not as if they were for all time.

But who are journalists? Strictly speaking, the term should be applied only to writers on the staff of daily newspapers, but nowadays it is applied to all writers on weekly, fortnightly, and monthly publications, and also to writers on the staffs of the great publishing houses who produce encyclopedias, works of reference, etc.

Nearly every newspaper and periodical of importance has on its staff a number of specialists who are chosen for their ability to write with the authority that comes from knowledge and experience. These include the dramatic, literary, music, wireless, and film critics, the political, scientific, social, financial, military, flying, commercial, and fashion correspondents, and experts on the various branches of sport.

Further mention may be made of the special correspondents who are sent abroad by the leading papers and the news agencies, and are either permanently stationed in the great cities of the Continent and of the world or are commissioned to "write up" some particular event.

There is no question about the importance of the journalistic profession. Lord Macaulay once said that the writers for newspapers constituted the "fourth estate," more important—as Edmund Burke once exclaimed, pointing to the reporters' gallery in the British House of Commons—than the original three estates of clergy, nobles, and freemen. Journalists, with the proprietors of the newspapers and other publications which they serve, may be said to have in their hands the future of the world. What they write may arouse hatred between individuals and classes or, on the other hand, may lead to understanding and fruitful co-operation. They may do much to arouse a feeling of hostility between the nations and so cause devastating wars, or they may be able to point men to the paths of peace. They may pander to the basest passions of their readers, fostering the love for the sensational and morbid, or they may refuse to have anything to do with prying into the tragedies of private individuals.

As is true of so many other things, journalists are born and not made. A journalist must



SUB EDITORS AT WORK ON TOMORROW'S DAILY TELEGRAPH' J Dixon-Scott

Here is one of the rooms in which a great daily newspaper, the Daily Telegraph and Morning Post, is made ready for the public. The business of a sub-editor is to take the copy 'as it comes from the reporters, and to put it into such a shape that it is ready to be set up in type as part of tomorrow's paper. At the head of the table sits the "chief sub" while beyond him are specialists in various subjects. In front of each man is a spike, the writer of copy that is impaled on this is doomed to disappointment, for he will not see his 'story' in tomorrow's paper.

have a "nose" for a good "story." He must be able to see a story where another man notes only the commonplace. He must ever be on the alert for the tragic in human affairs, and he must remember, too, that there is a human comedy. It goes without saying that he must be interested in the world and its people. You may be able to write a great and a good book by sitting in your own study far from the human bustle, but you will never be a good journalist unless you mix with the crowd in the streets. If you want to move men and women by your pen you must move *with* them.

It is still true to say that the best school for a budding journalist is the local paper. The big newspapers, more particularly those which are issued in London, employ a very large number of journalists, but their work is so specialized that it is very difficult to obtain a comprehensive idea of newspaper production as a whole. On a local paper, on the other hand, the journalist beginner will not only have to report football matches and concerts, sermons and wedding receptions, but he will have to see to the advertising and the "make up" of the paper and will learn much about illustrations and reproduction of photographs.

Of late years University classes have been established in journalism. The University of London offers a diploma for journalism awarded on the result of an examination after a two years' course. The full syllabus and copies of the regulations may be obtained on application to the Registrar, University of London, Bloomsbury, W.C. Before entering upon the course it is highly advisable to become proficient in shorthand and typewriting. The two professional organizations of journalists—the Institute of Journalists and the National Union of Journalists—are also keenly interested in securing and maintaining a high standard of professional education amongst journalists.

Julius. Three Popes have borne the name of Julius. The most important was Julius II, who was Pope from 1503 to 1513. Born in 1443, he was a great and judicious patron of art, and Raphael, Michelangelo, and other of the Renaissance artists owed much to his encouragement. It was he who began the rebuilding of the vast cathedral of St. Peter at Rome.

Jung, CARL GUSTAVE (born 1875). Few doctors have devoted themselves so entirely to the study of mental life, usually called psychology, as has this brilliant Swiss scientist.

Born at Basle July 26, 1875, Jung graduated in medicine at the university there, and then went to Paris to continue his studies. At this time Freud (*qv*), the "father of psychoanalysis," was convulsing the intellectual world by his new theories of mental actions, behaviour, and abnormal impulses, and Jung was irresistibly drawn to him. He joined Freud, becoming his most enthusiastic disciple, and devoted himself to mental health and mental diseases, their manifestations and causes.

Returning to Switzerland, Jung became physician at the Psychiatric (mental diseases) Clinic and lecturer in the same subject at Zurich University (1900-1913). Here he threw over the chief theories of his master, Freud, and invented his system of "analytical psychology," based on an ingenious theory that divides people into two main groups—*introverts*,



TWISTED JUNIPER ON A HILLSIDE

The juniper is a tree that grows especially on bare hillsides, and consequently suffers a good deal from the effects of the wind. This example, so bent and weather-worn, may be several hundred years old, for junipers grow very slowly and never reach any great size.

Photo: Natural History Museum

or those whose mental processes are governed from within their own consciousness, and *extroverts*, or those whose impulses are governed largely by external environment.

Thus, introverts are unsocial and outwardly unemotional, prone to think and read in solitude, while extroverts are lively, essentially sociable and readily free to express their emotions, and generally are fonder of music, pictures or anything possessing sensuous beauty than of study.

By rejecting the Freudian theory that all behaviour is based on sexuality, Jung drew to himself a large, admiring body of thinkers who found in his theory of a "universal life urge," the *libido*, a better solution of the problem of human motive force than in Freud's doctrines.

His chief writings include "Psychology of Dementia Praecox" (1906), "Psychoanalysis" (1912), "Psychology of the Unconscious" (1916), "Studies in Word Association" (1916), "Analytical Psychology" (1917), "Psychological Types" (1923), and "Modern Man in Search of a Soul" (1933).

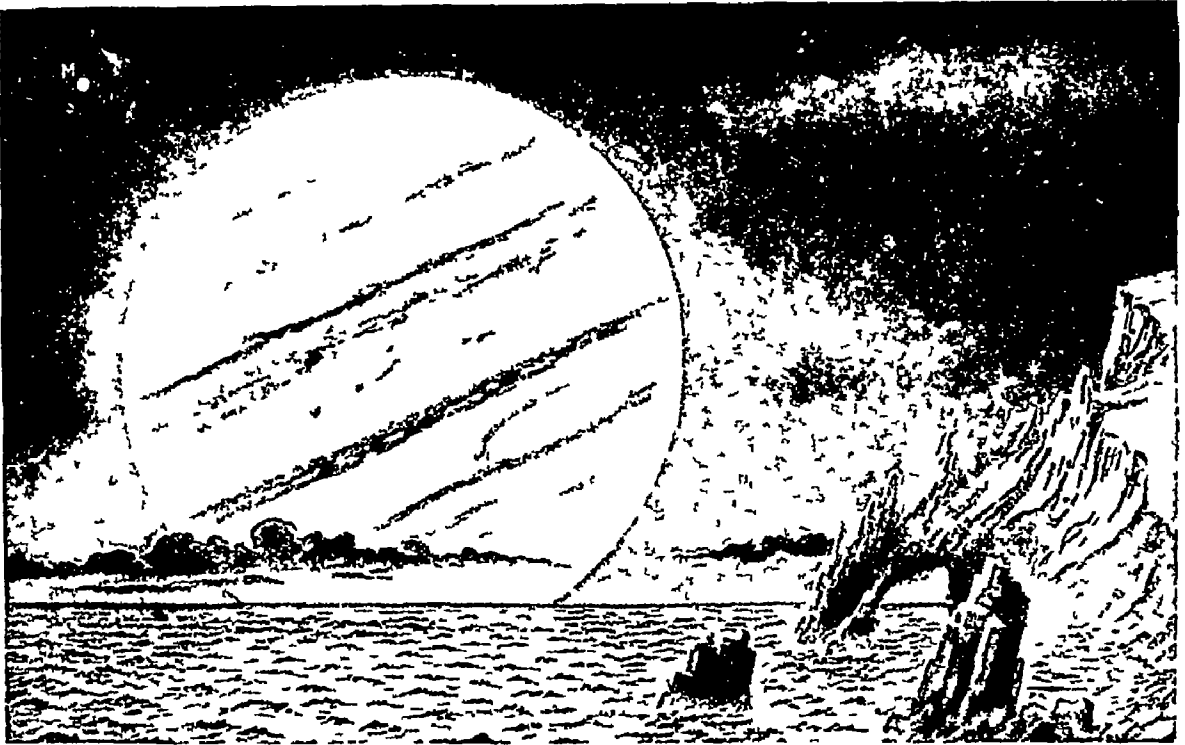
Juniper. You would be excused for not recognizing this as a conifer, for it has berry-like fruits instead of cones, which cling tightly to the branches, their grey-blue colour harmonizing with the dull green of the needle-like foliage.

There are about 30 species of juniper, widely distributed in the cooler parts of the Northern Hemisphere, of which the "red cedar" is a variety. Its fragrant heart-wood is highly valued in America for cabinet work and for pencils, while its indestructibility under all weather conditions makes it valuable for fence posts. The species known in Europe, however, is the common juniper (*Juniperus communis*), a smaller tree, often a mere shrub found especially on limestone hills. Its berries are used to flavour gin, which in fact gets its name from *genieve*, the French for the tree.

Juno. The chief Roman goddess, identified with the Greek goddess Hera. Among the Greeks she was said to be the daughter of Cronos (Time) and of Rhea, who in turn was the daughter of the Sky and the Earth. She became the wife of Zeus (or Jupiter), and the mother of Mars. As the special goddess of marriage and women she was worshipped annually on March 1, and as the moon goddess she was worshipped each month at the new moon. She had many shrines in Greece, and in Rome she had two temples. At one of these she was known as "Juno Regina," or "Juno Queen of Heaven", at the other as "Juno Moneta," or "Juno Giver of Good Counsel". Since the temple of Juno Moneta was

used as a mint, the word "moneta" came to be used for "money," and from it our word money is derived. In Roman art, Juno often appears in a chariot drawn by sacred peacocks.

Jupiter. In the name Jupiter the syllable "Ju" comes from the same root as the Greek "Zeus," while the syllables "piter" are really *pater*, or "father". So Jupiter means literally "Zeus the Father"—the chief of the Greek gods of Mount Olympus. He was worshipped in many places and under many names, but in Rome his chief temple stood on the Capitoline Hill. (See Zeus). "Jove" is another form of Jupiter, and thus when we exclaim "By Jove" we are really using the name of this old god of the Romans of long ago.



JUPITER, GIANT OF THE SOLAR SYSTEM

Were Jupiter as near to us as the moon, it would appear as awe inspiring as it is shown in this picture. Its colossal size may be gauged by comparison with our moon (marked M) and the constellation of Orion, seen on the right. Jupiter has eleven moons, one of which (Io) is 261 000 miles from the planet. So this view of Jupiter is very similar to that which an inhabitant of Io might see. The dark streaks and white spots on Jupiter's disk are storms travelling through its atmosphere.

From the drawing by G. F. Morrell

The name Jupiter is also given to the largest planet of the solar system, the fifth in order from the sun. It is curiously marked with dark belts, and has eleven satellites or moons. It takes Jupiter nearly twelve earth years to go round the sun. The pull of gravitation on Jupiter is so much stronger than on the earth that a body there weighs more than twice as much.

Jura Mountains. (Pron jōō'ra) The same geological force which crumpled the earth's crust and formed the magnificent and lofty Alps produced the low uneven Jura Mountains, on the border of France and Switzerland. These mountains cannot boast the grandeur and beauty of the Alps, and the area covered by them is but a small part of that of the Alps. The highest elevation, Crête de la Neige, is only 5,654 ft., and the average height about 2,600 ft.

The Jura range is about 156 miles long by 38 miles broad, and extends from south-west to north-east from the elbow of the Rhine to the elbow of the Rhône. Excepting in its central portion the range is cut crosswise by many deep, sharp ravines and valleys. The westward side of the mountains descends by gentle slopes to the fertile plains of France, but the eastern side is precipitous, and its foaming streamlets dash down to feed the waters of Lakes Geneva and Neuchâtel below.

At the extreme north end of the range is the famous Belfort Gap, a broad pass in the low

rolling hills between the Vosges and Jura Mountains. This pass may well be called the "front door of France," for it opens on the most beautiful, fertile, and prosperous section of the country and is the highway between eastern France and central Europe. In 1870-71 this was one of the roads by which Germany invaded France, but in the World War of 1914-18 this route was not attempted. For all its apparent accessibility this pass would prove a costly adventure for an enemy attempting to march through it, because it is very strongly fortified.

The peasants pasture their flocks on the grassy uplands of the Jura and some farming is carried on, mostly wheat raising. Mining is of little importance. The mountains are more sparsely wooded than the Black Forest, though the south-west section is famous for its wooden toys manufactured from the boxwood which grows in the mountains. Flourishing little towns have been built on the slopes of the mountains, and their prosperous inhabitants busy themselves principally with the manufacture of watches and spectacles. The climate throughout is cold and damp in winter.

Jury. In an enclosed space at the side of the judge in the court room sit the twelve men and women of the jury. They listen to the evidence tendered by the witnesses, to the statement of the case by the lawyers, and to the judge's instructions to them on the law and the evidence.



A TRIAL BY GRAND JURY IN THE DAYS OF KING ALFRED

This famous picture by C W Cope portrays an Anglo-Saxon institution which bore a marked resemblance to the modern grand jury. The twelve senior "thanes" of a district were appointed to hear the charges against any man accused of a crime and to determine whether the evidence warranted holding him for a test of his guilt or innocence.

in the case. Then they retire to a private room where they are locked in. The judge may keep them there as long as he thinks there is a reasonable hope of their agreeing. When they return to the court they have usually all agreed, and the fate of the prisoner depends upon the verdict of "guilty" or "not guilty," read by the "foreman," whom they have chosen. If they have not agreed they are dismissed and a new trial is held.

In all criminal cases an acquittal is conclusive. If, however, the evidence is clearly insufficient to establish guilt, the judge may direct a verdict of not guilty or, after a verdict of guilty, may grant a new trial if it appears that legal error was permitted in the conduct of the case. In criminal cases the jury's verdict must be unanimous in England. Such a jury is a "petty jury." In England a majority verdict may be agreed on in civil cases. Under Scottish law a majority verdict is allowed, and the jury has the choice of three verdicts—"Guilty," "Not Guilty" and "Not Proven."

Until 1933 the "grand jury" was in general use throughout England. Its duty was to decide, after hearing the preliminary evidence against a man, whether the State should accuse him of a crime and hold him for trial. This grand jury,

or great jury, usually had twenty-three members, though the number varied, at times being only twelve. Whatever the number on the grand jury, twelve members had to agree. If they thought from the evidence they had heard that the accused was probably guilty, they *indicted* him or "brought in a true bill," and then he was tried by a petty jury. Cases usually came before a grand jury as a result of activity by the police, sheriff, or coroner. The grand jury—the oldest and probably the original type of jury—was abolished generally in 1933, and is now used only for certain types of cases in London and Middlesex.

Besides the petty and grand juries there is also the "coroner's jury," consisting of a minimum of seven or a maximum of eleven jurymen. This is summoned by the coroner in case of a sudden or violent death to decide whether the death was due to murder, suicide, accident, or natural causes, and therefore whether some person under suspicion of causing the death should not be held for further investigation.

In civil cases—that is, in controversies between individuals—juries are widely used to decide questions of fact. The judge applies the law to the facts as the jury finds them to be,

and renders judgement. Under certain circumstances the judge can direct a verdict, or if a verdict is manifestly improper, he can set it aside. Usually juries in such cases are not confined during the trial, as they are in important criminal cases.

The right of trial by jury is one of the most cherished rights of the Anglo Saxon nations. Of all our institutions—legislatures, courts, etc.—the jury is one of the oldest, and its development one of the chief gifts of England to the rest of the world. The Normans made use of the most primitive form after they conquered England in 1066. But the men who served at these “inquests,” as they were then called, had to know the facts themselves instead of learning them from witnesses. This sworn inquest was used chiefly by the king in transacting the business of the kingdom, but it represented also a notable participation by the freemen in the most important matters of government. Not until the reign of Henry II in the latter half of the 12th century were jurors changed from those who decided on the ground of what they knew to men who would decide solely on the evidence that they heard in court.

But how, you ask, were the trials conducted when they did not use a jury? In Anglo Saxon times, when a man accused of a crime could bring into court a sufficient number of his neighbours who were willing to swear to his innocence, he was released. In this trial by *compurgation* the number of compurgators depended upon the rank of the men who took the oath, and the importance of the case.

Then there was the trial by *ordeal*, which was really an appeal to God for a miracle to “make manifest the innocent and confound the guilty.”

In the ordeal by hot water or by hot iron, the accused plunged his hand into boiling water or carried a red hot iron a certain distance, if the hand healed in three days without pus, the accused was innocent. In the ordeal by cold water the accused was thrown into running water with hands and feet tied together, if he floated he was guilty, but if he sank he was innocent and was quickly hauled out.

Finally there was the trial by *combat*, or

judicial duel, in which a man proved his case by defeating his adversary in battle. As late as 1817 a man in England appealed to the old forgotten law of trial by combat, which was still on the statute book. His accuser refused the challenge and the man was freed. But trial by jury had been in use for centuries before that, and the old law was repealed the next year. (See also Courts of Justice)

Justinian I, EMPEROR OF THE EASTERN ROMAN EMPIRE (483 ?–565) To Justinian the world today owes a greater debt than to any other of the long line of emperors of the Eastern Empire, for it was through him that we received the Roman law in a usable form.

Justinian's parents were humble peasants, but through his uncle, the Emperor Justin I, he received the best education that Constantinople afforded. On the death of his uncle in 527 Justinian succeeded him as emperor.

Justinian's ambition was to restore the grandeur of the empire by legislation, by great public works, and especially by conquering the German kingdoms of the West. He had the rare faculty of choosing the most competent people for his helpers. His wife, the Empress Theodora, was a brilliant woman, who increased the splendour of the court while she tyrannized over the nobles.



‘TWELVE GOOD MEN AND TRUE’

Trial by jury like many other democratic institutions and legal rights now practised in almost every civilized country of the world, derives from England where it is still regarded as one of the bulwarks of our liberties. This photograph shows a jury listening intently to a judge's summing-up before retiring to consider their verdict.

Photo exhibited in the London Salon of Photography

and magistrates. She was charitable to the poor, and once, in a riot between the Blue and Green factions in Constantinople, her firmness saved the throne for her husband, who was ready to flee. Also in Belisarius and Narses the Emperor found commanders of remarkable genius, well qualified to lead in the great work of conquest. They reconquered both North Africa and Italy.

As a builder Justinian filled every corner of his empire with churches, aqueducts, forts, and

hospitals The greatest of his buildings was the magnificent dome-covered cathedral of St Sophia in Constantinople (now Istanbul), his capital city His people were burdened with heavy taxes to pay for all this magnificence, and he left at his death an empire well on the way to decline

Justinian was most noted, however, as the emperor who codified the Roman law in the form in which it was handed down to later ages Under his authority the lawyer Tribonian headed a commission which collected and compiled the "Code" containing 12 books of Roman laws This was followed by the "Digest" or "Pandects," a summary of the decisions of Roman lawyers and judges concerning these laws, and finally by the "Institutes," a text-book for students of law These

writings together form the Civil Law (*Corpus Juris Civilis*) on which are based the laws of some modern nations, including France and Italy

Jute. The sack that holds your potatoes was once a mass of silky fibres in the stalks of jute plants—members of the genus *Corchorus*—



THE EMPEROR JUSTINIAN

Justinian is commemorated by some remarkable mosaics at Ravenna Here is one of them—a portrait of the Emperor (a good example of Byzantine art), in the Basilica of St. Apollinare Nuovo

that carry fine seeds and sugars some is coarse and open, such as that used for your potatoes Gunny cloth is used to wrap cotton bales, furniture for shipping, and in many other ways where coarse cloth is required The fibre is also used for jute rope, cord, and twine, and coarse paper

Jute takes dye readily, and hence is woven into fibre carpets and curtains for artistic yet inexpensive furnishings Its fine and silky character fits it for false hair and wigs worn by actors It is sometimes used as an adulterant in the manufacture of various fabrics

Compared with hemp, manila, sisal, or ramie fibres, jute is inferior in strength, tenacity, and durability, but because of low price and adaptability it holds an important place in the manufacturing world Dundee in Scotland was formerly the greatest jute manufacturing town in the world, but its place has been taken by Calcutta, where factories can be erected closer to the raw material India, as a matter of fact, produces practically the entire world's supply of jute, for, although jute can be grown elsewhere, Indian workers get very low wages




IN AN INDIAN JUTE WAREHOUSE

India produces jute for the whole world, and 85 per cent of it comes from Bengal The greater part of the crop goes to the Calcutta mills to be woven into hessian and sacking In this shed the fibre is being sorted before going to the mills After cutting the crop is "retted" in water before the fibre can be extracted by hand

Courtesy of the High Commissioner for India



er, or ing was added
words, as *music*(L)

YOU would scarcely guess that our letter K was once the Egyptian hieroglyph which was the picture of a bowl. But when written it looked like this  and its modified form in the Phoenician alphabet begins to look somewhat like our K, written backward. The Phoenicians called it *Kaph*, which means 'the palm of the hand,' or perhaps the 'bent hand.' The Greeks in transferring *Kaph* to their alphabet gave it its present form and changed the name to *Kappa*. In Latin, after C had come to be used for the *k* sound there was no need of K and it fell into disuse except in certain abbreviations. Anglo Saxon and Early English under Latin influence likewise used C for the *k* sound. Thus *king* for example, was originally spelled *cynia* later *kyng*. But the practice of giving C the *s* or *sh* sound before certain vowels (as in *century cinder, ocean*) led to confusion. Then K came to be used, particularly before *o* and *i*, for the hard sound, as in *kind, leg* etc. The combination *ck* was originally *ll*, the double consonant being used after a short vowel when *ed*,

Modern English has usually retained the *ck* even when final, but has dropped the *l* in some

Kaleidoscope. Since its invention by Sir David Brewster in 1817, the kaleidoscope has given pleasure to millions. It is one of



A Kaleidoscopic Pattern

the most interesting of scientific toys, presenting as it does a beautiful ever changing series of bright and coloured patterns. The simplest form is a tube about 12 inches long and 3 inches in diameter. Through this tube

run three mirrors which are joined together at their edges, forming a hollow triangle in the tube.

At one end there is a little compartment with bits of coloured glass of various sizes and shapes. The outer end of this compartment is clouded glass, and the inner end is clear glass. At the other end of the outside tube is the eye glass. When the tube is turned the coloured bits fall into different positions and are reflected over and over again in the mirrors. The kaleidoscope is used for designing carpets, etc.

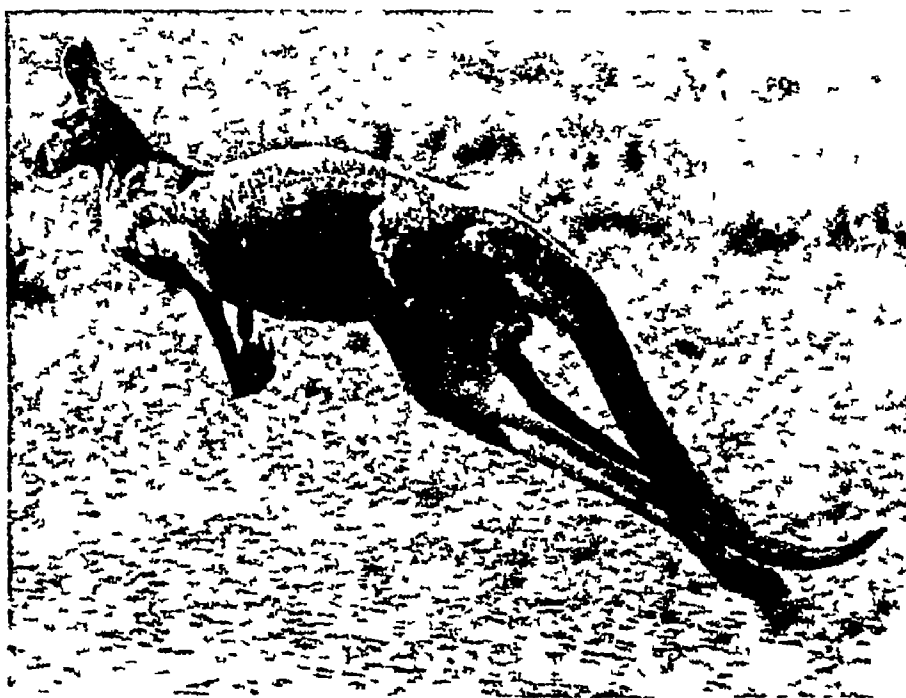
Kamchatka.

(Pron *ham chat'-ka*) This peninsula of eastern Siberia stretches into the Pacific, between the Bering Sea on the east and the Sea of Okhotsk on the west for a distance of

750 miles. It covers an area of 105,000 square miles, but the population is under 10,000.

Fishing and hunting constitute the chief occupations, and furs are the most valuable production. The peninsula contains many volcanoes, both extinct and active, one of which reaches 16,000 feet. Kamchatka was annexed by Russia at the close of the 17th century.

Kangaroo. If you like to be surprised, just watch the kangaroo in the Zoo for a while. You are sure to wonder, at first, why there is such a very high, strong fence of iron posts and netting round these queer-looking animals. You might say that they are like three-legged stools, for kangaroos rest on the hind-legs and a long fat tail. From this broad base their bodies taper up in the oddest way to narrow sloping shoulders and small deer-like heads.



A KANGAROO SHOWS ITS PACES

You have heard how a kangaroo can hop, but you are not likely to see many photos like this one showing it in action. Notice the tremendously long hind legs and the great thickness of the tail, which acts as a balancer when it leaps and as a support when it rests. The front legs with clawed feet, are held tucked up to the chest while the small size of the body assists "streamlining."

Australian National Travel Association

KANGAROO



Central Press

HOW THE KANGAROO CARRIES HER BABY

The kangaroo, as described in this page, belongs to the strange group of animals called, on account of the pouch in which they carry their young, marsupials. In this picture you see the pouch in use, in it is comfortably housed the baby kangaroo, its head looking out to survey the world. Even with this heavy weight the mother kangaroo can hop many feet at a time and keep up a great speed.

Their full bright eyes glance about, their rabbit-ears stand erect, listening. In front of the breast the short fore-paws are drooped as if they are there less for use than for ornament.

Sometimes the kangaroo drops on all fours and eats like a rabbit, at others he may be seen hopping about on his muscular hind legs, and then again it seems to be easy for him to pick up a carrot, hold it between his paws, and eat like a squirrel. The keeper knows what he is about when he scatters the food, putting some choice bits in the farthest corners of the pen. He does that so that you can see the animals jump.

No wonder the kangaroo can jump so far and so high. He has the biggest and strongest hind legs, for his size, of any animal in the

world. His hind feet are so long that he looks as if he is sitting on his knees. At the end of the foot is the biggest of big toes—the third of the original foot. It is in the middle of the foot, and has on it a long, sharp, wicked-looking, dagger-like claw. On one side of this big toe is a small one—the second. On the other side two further helpless little toes dangle—the fourth and fifth, used for digging up food and for cleaning purposes.

A long, long time ago, when there were all manner of strange animals, there were also kangaroos as big as a hippopotamus, with heads 3 feet long. Yet even these cannot have been much better at leaping than our living ones. An "old man" kangaroo of today, over 6 feet tall, can leap over a horse and rider, and then get away by jumping as fast as the horse can run.

These queer animals are found in only one region of the world—the big island continent of Australia and the neighbouring islands. Living on grass, small plants and the roots of herbs, they take the place of the deer and antelopes of other countries. Like other grass-eating animals, they live in herds with leaders, and are by nature very timid and peaceable.

There are about 50 species of kangaroos. The largest are as tall as a man, and weigh 150 lb, the smallest are not so big as a rabbit. Some live on wide plains, some in the mountains, one of the most interesting species is the tree-climbing kangaroo discovered in Queensland. If overtaken and attacked, these animals will usually show fight, and the giant kangaroo is capable of killing a dog or even a man with one slash of the big-toe claw.

The most surprising thing about the kangaroo is the way the mother cares for her new-born babies. If you watch hard, you may see two or three small heads appear from a curious pouch in the underside of the mother's body. It is a deep, flat, fur-lined pocket, and the mother kangaroo can shut the top as tight as your mother snaps the clasp of her handbag.

Kangaroo babies need that nest. When they are born they are less than 2 inches long, and blind, naked, and helpless. Such delicate little creatures are these young kangaroos that they would never be able to survive unless they had a perfectly safe place in which to spend the early days of their life. They live in the bag for months, scarcely moving. For a long time afterwards they sleep and travel in the pouch, leaving it to hop about and play, while learning to graze like their mothers.

All animals in which a pouch of this type is found are classed together, forming the group

Marsupialia (see *Marsupials*). Within this group, the kangaroos form the family *Macropodidae*. The kangaroos, by the way, are not the only creatures that have developed huge hind limbs and small fore legs for progression by jumping. There have been several quite distinct attempts in this direction, notably among the rodents, and such animals as the kangaroo rat and the jerboa are, in appearance at least, miniature kangaroos.

Kansas, U S A

This state is in the exact centre of the United States, and is largely a land of prairie made fertile by the industry of its farmers. Wheat is the principal cereal grown, while oil and coal are other products. In the east are dense forests producing walnut and other woods. The chief town is Kansas City (122,000), at the junction of the Missouri and Kansas. The basin of the latter and that of the Arkansas cover a large proportion of the state. Other towns are

Wichita (102,000) and Topeka, the state capital. **Kant**, IMMANUEL (1724-1804). Just as the study of Nature and the wonders of creation has been the passion and the life work of many of the greatest intellects, so also the study of the human mind, the subject to which Immanuel Kant devoted his truly great gifts, has attracted the deepest thinkers in all ages.



KANT'S 'CONSTITUTIONAL'

Immanuel Kant, the greatest of modern philosophers, regulated his life in the most methodical manner and invariably took an hour's walk after his dinner every day. He was small in stature and walked with a pronounced stoop.

But while the average man can follow and partly understand and, to a degree, participate in the researches of naturalists, he is generally somewhat perplexed by abstract philosophy.

The chief propositions of Kant's theory of knowledge, as they emerge through the maze of words, are the following. We cannot know things as they really are, but only as they appear to us, since they are modified by the "categories" (i.e., mental "frames" or divisions, into which all objects of thought might be classified), and by passing through the medium of space and time. Experience

alone supplies us with the material of knowledge, and it is impossible, by the exercise of thought, to attain to the knowledge of anything beyond such material. On this basis Kant builds his theory.

The person who would read and understand the philosophy of Kant must be at least familiar with logic and metaphysics. And to appreciate Kant's finer, subtler shades of meaning the reader should be able to read him in the original German.

Immanuel Kant was born at Königsberg, in East Prussia, April 22, 1724. He was the son of a saddler, and only by the self-denial of his parents did this greatest of modern philosophers obtain an education. His whole life was devoted to study, to lengthy writings on philosophy, and to his duties as lecturer and professor at the famous university of his native city.

The best-known works of Kant are "Dreams of a Visionary" (1766), "Critique of Pure Reason" (1781), "Pro-

legomena" (1783), "Critique of Practical Reason" (1788), and "Critique of Judgement" (1790).

Karachi, (Pron ka-rah'-chi), INDIA. This city depends for its prosperity almost entirely on the trade which passes through its harbour. It is the first port reached by ships and air-liners coming into India from the west (except for those which pass direct to Bombay), and the

cotton and wheat of Sind province and the whole of the vast Indus basin are collected here and exported in great quantity. Karachi is a coaling-station vital to the imperial lines of communication. Its population in 1931 was 263,000.

Kashmir. In the north of India, reaching from the plains of the Punjab northward over the western Himalaya ranges to the borders of Tibet, lies the beautiful mountainous state of Kashmir (or Cashmere).

It is a region of wild and gorgeous scenery, of splendid snow-crowned summits, cut by deep gorges and valleys filled with rich and varied vegetation. It is traversed by the river Indus, and in the south-west the valley of the upper Jhelum widens out to form the famous Vale of Kashmir, celebrated in Thomas Moore's poem "Lalla Rookh"—about 20 miles wide and girdled by mountain spurs which rise 14,000 and 15,000 feet above sea-level.

In its marsh lands and flooded rice-fields are mirrored the glory of the peaks, and for 30 miles along the valley the road threads its way past lake, river, hill, and temple, through a stately avenue of young poplar trees which march in close formation across the plain. Within the vale lies the summer capital and largest city of Kashmir, Srinagar (pop., 173,000), a sort of mountain Venice, where the frail tenements of the poor and the villas of the rich huddle together in neighbourly confusion. The winter capital is Jammu.

Although Kashmir has an area of nearly 85,000 sq miles, much of it is wild uninhabited mountain country, and the greater part of the population of more than 3,645,000 is gathered in the south-western part. Its cool healthy climate has made it a famous summer resort for Europeans in India, and much of the prosperity of the natives is due to these visitors. From the wool of its goats, yaks, and wild sheep were made the celebrated "Cashmere" shawls,

which first became fashionable in the reign of Napoleon. The great shawl industry was ruined, however, by the failure of the Paris market during the Franco-Prussian War of 1870, and later a famine scattered the weavers.

The carpet industry has to some extent replaced the shawl trade, but the most thriving industry today is that of silk weaving. The rose fields of the Vale of Kashmir give the finest attar, and Srinagar is noted for its silver work and wood carving. The staple crop of the valley is rice, and Indian corn, wheat, barley, and oats

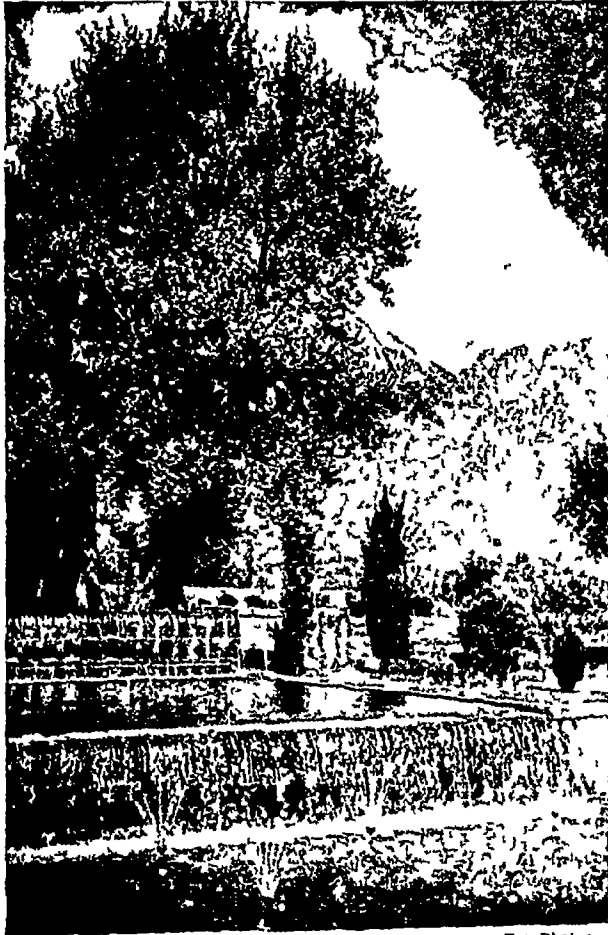
are also grown. The natives are a fair, well featured race, with all the characteristics of the Afghans and northern races. The religion of the Kashmiri—as they are called—is chiefly Mahomedan, though Hindus, Buddhists, and Sikhs are a strong minority. The ruler is a maharajah who is officially called by the title of the maharajah of Jammu and Kashmir.

Owing to its mountain seclusion on the border of Tibet, a little out of the path of the many invaders that swept India from the north-west, Kashmir has known few political changes. But her population has always been ravaged by natural evils, like disease, fire, flood, and earthquake. The state is under direct control of the government of India.

Kearton. If you are at all interested in animals and birds, and have any books about

them, you are sure to know the names of Richard and Cherry Kearton. Richard (1862–1928), the son of a yeoman farmer in remote Yorkshire Swaledale, became famous for writings on and photographs of birds, and indeed he was perhaps the first of the real bird photographers. His books, many of which are still popular, were hardly better known than the lectures which he gave at schools all over the country, always about the birds to which he had devoted his life.

Working with him was always his brother, Cherry Kearton, who was born in 1871 and who



A GARDEN IN KASHMIR

Fox Photos

The most famous garden in India is the Shalimar Bagh on the shores of Dal Lake in Kashmir. It is laid out with terraces and ornamental waters, while there are about 150 small fountains, some of which are seen in the foreground of the photograph.

is now more famous than Richard ever was. Cherry Kearton has done many fine animal films, some of which you will probably have seen, and published books about his travels, for, unlike his brother, he has not confined himself to a study of the creatures of Britain, but in Africa especially has taken his cinema outfit into the wildest places, making perfect records of the life of the jungle's wild creatures. No two brothers have done so much with camera and pen and by lecturing as these to increase the love of Nature among all sorts of people, old and young alike. Richard Kearton's books include "With Nature and a Camera," "Wonders of Wild Nature" and "Our Bird Friends". Cherry Kearton has written "Wild Life Across the World," "My Animal Friendships," and "Adventures with Animals and Men."

Keats, JOHN (1795-1821) "Here lies one whose name was writ in water." This is the epitaph which the great English poet, John Keats, wrote for himself in the melancholy days when he felt his death approaching, and despaired of winning that fame for which he so ardently longed. Keats lived only a little more than 25 years, and his whole poetical career

was but seven years long, yet during this brief period he wrote some of the greatest poems in the English language, crowded with musical lines of exquisite and haunting beauty.

John Keats was the son of a livery-stable keeper. He passed his early years, not close to Nature, as did most of our poets, but in the City of London. There was born in him an intense love of beauty, surpassing that of many other poets. "A thing of beauty is a joy for ever" is the first line of his "Endymion," and in his "Ode on a Grecian Urn," in which he seems indeed to have caught much of the ancient Greeks' worship of beauty, he declares

Beauty is truth, truth beauty—that is all
Ye know on earth, and all ye need to know

Beauty was all in all to Keats. Unlike his great contemporaries Shelley and Wordsworth, he had no desire to reform the world or to teach a

lesson. He was content if, by his magic power, he could make us see and hear and feel with our own senses those marvellous forms and colours and sounds that his imagination produced.

Keats was apprenticed to a surgeon in early youth, but his heart was elsewhere. "I find I cannot exist without Poetry," he declared. In 1816 he became acquainted with Leigh Hunt, Benjamin Haydon, the painter, and, through Hunt, with Shelley. In the following year he gave up his apothecary work and devoted the rest of his short life to poetry.



JOHN KEATS

Keats, inspired by the ideals of ancient Greece, loved beauty with an artist's fervour, and in the last four years of his short life he wrote poems which are among the most beautiful in the English language.

After the painting by W. Hilton National Portrait Gallery

In 1818 his first long poem, "Endymion," appeared. It was bitterly and harshly attacked by the reviewers, who overlooked its beauties and failed to see that its faults were due to immaturity. Other troubles crowded upon the young poet. He was in money difficulties, and, worst of all, he was tormented by a hopeless love affair. His health had begun to fail, and he rapidly developed consumption. In the autumn of 1820 he went to Italy, and early in the following year he died at Rome.

Keats's chief poems are "Endymion," "Isabella, or The Pot of Basil," "The Eve of St Agnes," "La Belle Dame Sans Merci," "Ode to a Nightingale," and a number of sonnets among which are

"On First Looking into Chapman's Homer." All were published between 1817 and 1820.

Keller, HELEN (born 1880) When only nineteen months old an American child, born at Tuscumbia, Alabama, was stricken with scarlet fever. Helen Keller, as the child was named, recovered, but at a terrible cost—she was now blind, deaf, and dumb.

When she was nearly seven years old, her parents, who had read Charles Dickens's account of the wonderful work done with another blind and deaf girl, Laura Bridgman, sent her to the Perkins Institute for the Blind, at Boston, U.S.A., where Anne Sullivan became her teacher.

From the first, the child learned with remarkable facility. She learned to read and spell the finger alphabet, to read Braille, and to write with a typewriter. Finally, by placing

her sensitive fingers on the lips and throat of her teachers, she was able not only to "hear" them speak, but—marvel of marvels—learned to speak herself. At 20 she had made such progress that she was able to enter Radcliffe College, getting her B.A. degree in 1904. She was made an LL.D. by the University of Glasgow in 1932. The success of her life is unparalleled in history, her literary achievements being remarkable even for a normal person.

Kelvin, WILLIAM THOMSON, 1ST BARON (1824–1907) Every English and American schoolboy knows the romantic story of the laying of the first successful transatlantic cable between Valentia Island, Ireland, and Newfoundland in 1865 by the Great Eastern (see Cables), the wonder-ship of the nineteenth century. But not everyone knows that it was the genius of William Thomson that made that epoch-making event possible.

Born in Belfast, June 26, 1824, young Thomson matriculated at ten years of age, and entered Peterhouse, Cambridge, in 1841, when only seventeen. Four years later he was second wrangler and first Smith's prizeman. For about a year he studied in Paris under Regnault, the French physicist, but returned in 1846 to take the chair of natural philosophy at Glasgow University, being then only twenty-two years old.



LORD KELVIN

Here is Lord Kelvin with his wonderful mariner's compass, patented in 1874. It is not affected by magnetic disturbances, and thus greatly lessens the difficulties of navigation.
Photo T & R Annan & Sons Glasgow

For fifty-three years, until his retirement in 1899, he held this professorship with such distinction that he received practically every honour which the scientific world had to bestow. During this period, and even after his retirement, his output in theoretical science and practical inventions can only be described as prodigious. It is amazing to reflect how, in his spare time, he could carry out with complete success such an onerous post as electrical engineer for English, French, American, Brazilian, and West Indian cable companies, and also invent the mirror galvanometer, the siphon recorder, the new mariner's compass, the navigational sounding machine, and so many electrical measuring and recording machines that it can truly be said that there is scarcely any electrical instrument or gauge (including the ordinary household meter) which was not invented or perfected by William Thomson.

It is impossible to give any full account of his amazing range of inventions. He devised every type of instrument, from the most delicate electric meters to domestic water-taps, and touched on every subject from a completely new theory of matter to researches into the heat of the earth's crust.

Kelvin's Work as a Physicist

Kelvin, the name by which posterity knows Thomson best, corresponded with and addressed scientific bodies in many foreign countries, and he encouraged and collaborated with other famous scientists.

Thus it was Kelvin's investigation of the discharge of the Leiden jar in 1853 that partly gave Hertz the key to his electro-magnetic researches which resulted in the discovery of Hertzian waves and made wireless telegraphy possible (See Hertz). In his collaboration with Joule (qv) on expansions, pressure temperature changes, and other phenomena of heat Kelvin produced the absolute scale of temperatures (1848) and in 1851 his theory of the dynamic nature of heat. His famous lectures on Molecular Dynamics and the Wave Theory of Light given at Johns Hopkins University, Baltimore, in 1884, were a permanent contribution to the profoundest problems of science.

Kelvin was knighted in 1866, made a peer in 1892, and given the Order of Merit in 1902. He was elected President of the British Association, 1871, of the Royal Society, 1890–1895, and Chancellor of Glasgow University, 1904. Even after his retirement he continued to work on the theory of matter and electricity and magnetism. Kelvin died December 17, 1907.

Kemal Ataturk (1881–1938) From time to time one hears people lament the fact that there is no room for real adventure in the world of today. Yet few men in all history have led so full a life and have survived so many

dangers and difficulties as this man who became the President of the Turkish republic

Mustafa was born in Salonika, Greece, of humble parentage. After a wild life as a child, he entered the army secretly and at once began to do extremely well. He was brilliant at mathematics and at all military work, and soon found favour with his superiors. The name "Kemal" was given him at this time by one of his masters, whose name was likewise "Mustafa." "Kemal" means "perfection," so that the name both distinguished the lad from his teacher and shows what the latter thought of him. But in spite of his success Mustafa Kemal was unpopular with his fellows, for he was a complete individualist, caring little for the opinions or actions of anyone but himself. Unless he was at the top and undisputed leader, he would sulk, and if his lead was undisputed, he was no longer interested in his subordinates. He was soon a teacher himself and his early experience later stood him in good stead.

As a soldier young Mustafa Kemal rose rapidly, but he took a part in politics and became a leader of the revolutionary or "Young Turk" party, which comprised almost all the younger officers. He was arrested several times, and at least once only the recognition of his exceptional brilliance saved him from execution.

Wherever he went, trouble followed. His military experience took him all over the Turkish Empire, and shortly before the World War broke out, he had made plans for an elaborate defence of the Dardanelles. Thus it was that when the Turkish High Command had given up all hope, Mustafa Kemal, with only a few men, turned the tide of the defence, took the offensive, and was in the end directly responsible for turning the British out of the Gallipoli peninsula. Against the Russians in the Caucasus, and then again against the British in Mesopotamia, he fought brilliantly, and although he was unable to save the situation in the latter country, he made good what would otherwise have been a disastrous retreat. No sooner was the World War over than Kemal was fighting the Greeks, who claimed part of Asia Minor, and against them, again, he turned the whole tide of the war once he obtained the supreme command, being responsible in person for the final Turkish victory at Smyrna.

Restoring Turkey to the Map

All the while, Mustafa Kemal had only two ideas at heart: the complete liberation of the Turkish nation, and the placing of himself as head of his country. And all the while, partly through his political views, partly on account of his bitterness and his unapproachableness, he was being kept out of office by the various unprogressive governments which still ruled the country.



KEMAL ATATURK

Kemal Ataturk, then called Mustafa Kemal, began his career as a soldier. He is here seen in civilian clothes with the officers of the Turkish General Staff reviewing a guard of honour. The surname Ataturk, which Kemal adopted for himself, means 'Father of the Turks.'

Yet wherever he went, his oratory, his brilliant understanding of his audience, and his great political skill made his ideas acceptable. So it was that in due course the inevitable happened, and after the long series of political victories which included the abolition of the sultanate and Moslem caliphate, and the proclamation of the republic, Mustafa Kemal was unanimously elected president of Turkey. And in his case, being president was virtually the same as being dictator.

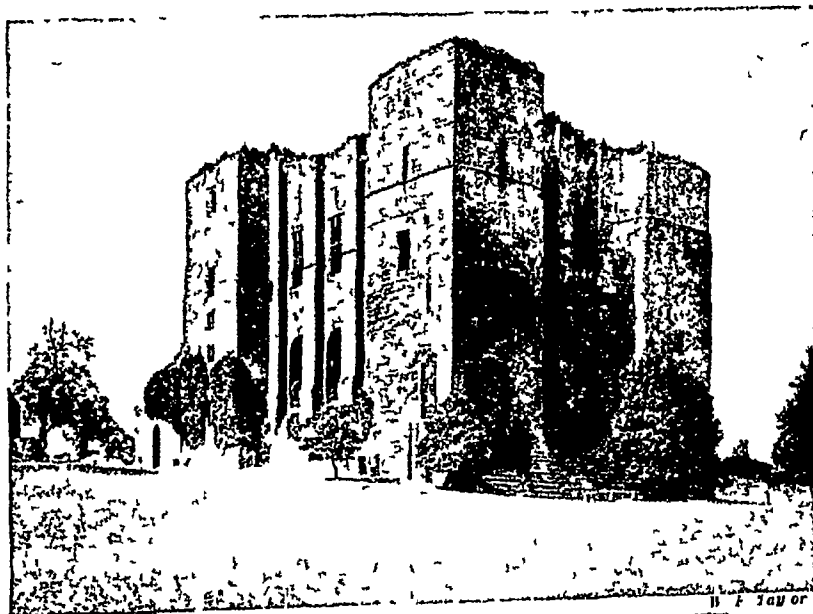
From that date, October 29, 1923, Mustafa Kemal devoted himself to the work of westernizing his country. Women dropped Moslem dress and went about unveiled, the Turkish alphabet was westernized—and Mustafa Kemal became once more the schoolmaster, touring the country with a blackboard and chalks, lecturing everywhere on his new ideas—and ordinary hats replaced the traditional fez of the Moslems. Thus it was that Kemal Ataturk, as he finally came to call himself, having broken the political as well as the religious opposition, not only became the ruler but, as he could claim with justice, the maker of modern Turkey.

He died on November 10, 1938.

Kemsley, JAMES GOMER BERRY, 1st BARON (born 1883) Youngest of the three famous Berry brothers, Gomer Berry was born at Merthyr Tydfil, May 7, 1883, and from his youth he has been associated with his brother, William Ewert Berry, Lord Camrose, in the building up of the great newspaper enterprises which have made the name of Berry famous throughout the world. Some account of their achievements is given in the article on Lord Camrose (*see* page 793), and there, too, is told how, when the Berry Group of papers had grown to such an extent that a division of interests had become desirable, Lord Kemsley assumed control of the "Sunday Times," "Daily Sketch," and the "Sunday Graphic," as well as of the numerous provincial journals controlled by Allied Newspapers, Limited. Created a baronet in 1928, Gomer Berry was raised to the peerage in 1936, when he chose the title of Baron Kemsley of Farnham Royal—the Bucks village in which he has his home.

Lord Kemsley is not only known as a highly successful newspaper proprietor, but has been High Sheriff of his county since 1929. He is also known as a generous supporter of many a deserving charity.

Kenilworth. This pleasant town in the heart of Warwickshire, with a population of 7,000, is chiefly noted for its magnificent ruined castle, the walls of which enclose about seven acres. This castle, which dates back to the early twelfth century and has a long and stirring history, is a prominent feature in Sir Walter Scott's "Kenilworth."



KENILWORTH CASTLE, DESCRIBED BY SCOTT

The walls of Kenilworth Castle enclose an area of seven acres. Geoffrey de Clinton, a Norman, built it early in the 12th century, and Caesar's Tower (above) is all that remains of his work. Its walls are sixteen feet thick which accounts for its having lasted so well. There is also a gatehouse which is still lived in, and a great hall with beautiful windows, built by John of Gaunt.

In this novel the story is told of how Queen Elizabeth came to the castle to visit Robert Dudley, Earl of Leicester (who had received the castle at the Queen's hands in 1562), and how the tragic heroine Amy Robsart met her death.

Amy had been secretly married to Leicester, who, however, had indulged in hopes of becoming the Queen's consort and so kept the marriage secret and his bride a prisoner at Cumnor Place. Amy escaped to Kenilworth and appealed to the Queen, but at this critical moment Robert Varney, Leicester's attendant, claimed her as his wife, saying that she was distraught. Amy wrote a letter of explanation and appeal to Leicester, but its delivery was delayed, and she fell through a trap door at Cumnor, as she was hastening, misled by Varney's imitation of Leicester's whistle, to meet her husband.

In spite of this tragedy, Elizabeth continued to favour Leicester, and in 1575 she was his guest at Kenilworth for 18 days, when took place the entertainment described by Scott.

Kent, ENGLISH CO. The south-easterly corner of England is one of the most historic localities on British soil. It abuts on the Strait of Dover, and its nearness to the Continent has repeatedly meant that here invading foemen have first sought a footing, and through the gateway of Kent came the Romans and Normans.

Kent, with an area of 1,555 square miles, is a beautiful and fertile county, with a mild climate and a flourishing agricultural industry. Known as the "Garden of England," Kent,

with its orchards and fruit farms, presents a fairyland picture of variegated blossom. Market-gardening and sheep raising are other important pursuits. Its hop-fields are unrivalled, and the district known as the Weald, and those along the borders of the Thames and the Medway, comprise some of the finest farming country in England, and are particularly rich in rural scenery. Besides the south-eastern suburbs of London, which are now very important industrial areas, Kent has a number of large towns within its borders, including Maidstone (the county town, population, 42,000), Ashford, a market town and railway centre, Gravesend, a paper-milling centre, Whitstable, world-famous for oysters, Canterbury, with its great

double cruciform, cathedral, Chat ham, Rochester, Folkestone, Dover, and Ramsgate and Margate, the favourite watering places of millions of Londoners

Towns of note in the Weald of West Kent include Tunbridge Wells, an inland spa, Tonbridge, on the Medway, with its castle and public school, and Sevenoaks, near which are historic Knole House and its park, and noble Penshurst Place. East of Maidstone is Leeds Castle, one of the most perfect buildings of its type. In the far south is Romney Marsh, from Hythe and Dymchurch to Dungeness runs a fascinating "built to scale" light railway.

Kent is particularly strong in literary associations. The county forms the background to much of Dickens's "Pickwick Papers" and "David Copperfield," while the pilgrims of Chaucer's "Canterbury Tales" travelled along what is now the Dover Road and was once Watling Street. The Pilgrims' Way itself runs from west to east across the county to Canterbury. Darwin lived and worked at Downe in the Kentish countryside.

A striking physical feature of Kent is the range of chalk hills which crosses the county from east to west, known as the North Downs. The river Medway divides Kent into East Kent and West Kent, and such is local pride and tradition that a man born east of the Medway is called "a Man of Kent," while one born west of the river is known as "a Kentish man." Another curiosity is the survival of the "Isles" of Thanet and Sheppey. On that part of the Kentish coast west of Margate the sea is constantly making inroads on the land, while at other low lying points the land is being gradually extended by deposits left by the sea. The Kent coal fields near Dover, discovered in 1890, are being successfully developed. Population, about 1,218,000.

Kentucky, U S A Lying between the northern and southern states of the U S A, Kentucky (area, 40,000 sq miles, population, 2,614,000) retains many of the characteristics of both areas.



THE PILGRIMS' WAY IN KENT

The ancient road running from Winchester to Canterbury, known as the Pilgrims' Way, dates from many centuries before the time when pilgrims flocked along it to Becket's shrine. Parts of the road indeed, date from the Stone Age, when the plains below were dangerous trackless forests and the only safe path was along the top of the downs. This view was taken near Wrotham.

Photo Dell & Wainwright

It is largely an agricultural state—particularly in the Blue Grass region of the north—and has long been famous for its horse breeding. At Louisville is staged the greatest horse-race of America—the Kentucky Derby. In the centre of Kentucky are 9,000 square miles of vast underground caverns, the most famous being the Mammoth Cave and the Colossal Cavern. The capital is Frankfort (pop., 11,000), but Louisville is by far the largest city, with a population over the 300,000 mark. It is the centre of the tobacco industry, and lies on the river Ohio, which forms the northern boundary of the state.

Kepler, JOHANN (1571–1630) The son of a German soldier of fortune, cradled in poverty and neglect, from childhood crippled in the hands, so that manual dexterity with instruments was impossible for him, too dim sighted to make keen observations, too delicate of constitution to bear long exposure to night air—surely never was a great astronomer so handicapped as Johann Kepler. He was educated at the University of Tübingen for the ministry, but with his appointment to the chair of mathematics and astronomy at Graz (Austria) came the call to his life-work.

Astronomers of that day were mostly astrologers and fortune telling charlatans, but Kepler bent all his energies to extracting from observations of the stars some real knowledge of the universe. All that was yet known of

planetary motion was what Copernicus had established—that the planets move, not around the earth, but about the sun (in circles, it was then supposed) Two other great men, Galileo, an Italian, and Tycho Brahe, a Dane, were seriously studying the heavens at this time Kepler became acquainted with them through correspondence, and in 1600 accepted an invitation to become Tycho Brahe's assistant in his observatory near Prague (Bohemia) Brahe's death the next year opened the way for Kepler's appointment to succeed him as mathematician and astronomer to the Emperor Rudolph II He now devoted himself even more to discovery One theory after another was tried and abandoned, until at last he hailed with delight the three laws which brought order out of the chaos of astronomy, and prepared the ground for Newton's discovery of the law of gravitation (*See Astronomy*)

To the end of his life Kepler was dogged by misfortune—by war, which interrupted his work, by illness, domestic calamity, and poverty—his salary was always in arrears Nor was his position improved when, in 1628, he left the emperor's service to enter that of Wallenstein, the great general of the Thirty Years' War

The laws of planetary motion, which are still known as "Kepler's laws," may be stated as follows (1) The path of every planet in its motion about the sun forms an ellipse, with the sun at one focus (2) The speed of the planet in its orbit varies, so that the line joining the centre of the sun with the centre of the planet sweeps over equal areas in equal times (3) The time taken by any planet in its revolution about the sun has a definite relation to its distance from the sun, the "square" of its time being in exact proportion to the "cube" of its distance These three laws give us the principle "by which the universe is balanced," and enable astronomers to tell the position of a planet at any given time The laws were enunciated in Kepler's "*Harmonices Mundi*" (1619)



JOHANN KEPLER

The famous scientist, Johann Kepler, gave up theology to become professor of "astronomy" But it turned out that the work he was expected to do was really astrology Later he turned his attention to the scientific aspect of the subject with remarkable success

From an engraving by F. Mackenzie

Kerry, Co OF EIRE Kerry is the most westerly and one of the largest counties in Eire It is a land of mountain and lake, of beautiful sea loughs and wild headlands reaching out into the great western ocean Here are the famous Lakes of Killarney, the Macgillicuddy range of mountains, with Carruntuohill, 3,414 ft., highest peak in Ireland, the beautiful bay of Tralee, and Valentia Island, the starting-point of the first transatlantic cable

Kerry, which is in the province of Munster, is rich in historical and literary associations Agriculture is the chief industry, deep sea and

coastal fishing and the tourist trade coming next Kerry cattle, famous alike for high milk yields and high butter-fat percentage, have for a long time been in demand in English dairying circles, and now form a special class at all great agricultural shows Tralee (population, 10,000 is the county town The area of Kerry is approximately 1,815 sq miles and the population 140,000

Kew Gardens.

If you are in London you are sure sooner or later to visit these, the world's most famous botanical gardens And don't let the phrase, "botanical gardens," put you off For there is very little botanical about Kew—at least in so far as the ordinary visitor sees it The flowers and trees and shrubs are, indeed, arranged chiefly according to their botanical classifications, so that

you will find all the different elm trees, or all the various conifers, growing in groups, but in general, Kew Gardens are simply a group of large gardens They are full of flowers of all sorts, and at all times are worth a visit for the sake of the flowers alone Nor are these all garden flowers Many of them are our English wild flowers, and some even, such as the famous bluebells, are growing under just the same conditions as they might in the country far from London

Kew Gardens as they are now were laid out by William Aiton (1731–1793) in 1759, and although there had been botanic gardens in the grounds of Kew House for many years, he may well be



AT KEW IN THE SPRING OF THE YEAR

Topical

Although this photograph was taken very early in the year, as you can see by the leafless trees, there were plenty of crocuses in bloom. These are among the earliest of the flowers that make Kew Gardens, throughout the year, one of the best-loved of all the Londoners' spare-time haunts. This photograph is taken looking across the lake with one of the museums just showing behind the trees on the right. Besides flowers and trees of every sort, Kew has many large hot-houses in which grow palms, orchids and other exotics and even bananas which ripen every year.

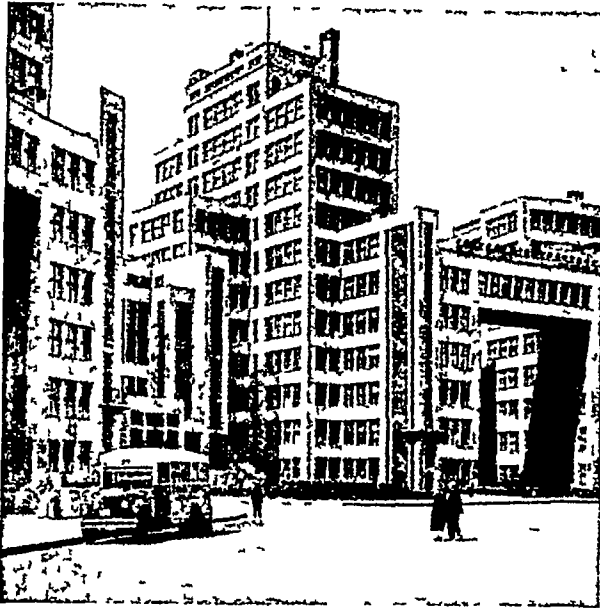
considered the "founder of Kew." He was assisted by his greatest patron, Sir Joseph Banks (q.v.), and it was he who started the Gardens' long tradition of collecting plants from all parts of the world, rearing them from seed if possible, and distributing them, if necessary, to other parts. Thus, it is through Kew that the rubber plant was introduced into Malaya, and through Kew, too, that the quinine plant was first sent to India.

The original gardens were only 11 acres in extent, but the Gardens now cover nearly 300 acres, only a comparatively small part of which is devoted to the purely botanic side. Nevertheless, there is, as you may see for yourself, a real botanic section, where all sorts of herbaceous plants are grown in beds arranged according to their families. There are, too, several museums, and large hot houses for various types of plants—such as the lovely orchid houses, and the cactus house where is a most wonderful collection of these weird plants. Then there are the famous flagstaff, a single pole of Douglas fir, 215 feet in height, Kew Palace, where George III often stayed, and the lovely little Queen's Cottage, as well as a Chinese Pagoda and a replica of a Japanese gateway. The old town

of Kew, too, though now to all intents a part of London, still retains much character of its own.

Kharkov. (Pron khar'-kof) One of the most modern cities in the Soviet Union, Kharkov ranks third (after Moscow and Leningrad) as an industrial centre. This city in the eastern Ukraine, about 450 miles south of Moscow, was founded by the Cossacks as a fort in 1654. Since the 18th century it has been important in the administration of the country. In 1917-20 it was overrun by various armies, but was finally captured by the Bolsheviks. Till 1934 it was the seat of government for the Ukraine.

Around Kharkov is one of the richest agricultural regions in the world, famous especially for grain and sugar beet. Near by, to the south and south east, are the valuable minerals and coal fields of the Donetz river basin, and to the south-west the great iron deposits of Krivoi Rog. The World War interrupted the city's industrial development, but since 1920 there has been a remarkable expansion. Among the chief manufactures are machinery, tractors, agricultural implements, coal products, and aeroplane equipment. The manufacture of electric generators and electrical equipment is



KHARKOV'S NEW ARCHITECTURE

Much of the centre of Kharkov has been rebuilt since it became one of the most important manufacturing centres of Russia. Above is the great modern block of the House of State Industry, erected in 1928.

Photo Ewing Galloway

another large industry, created by the building of great hydro-electric plants to the south-west of the river Dnieper.

Although it stands at the junction of two small rivers, the city has no navigable water. But six railways and a rapidly expanding air traffic make it a busy collecting and distributing centre for the entire Soviet Union.

Gigantic factories, new streets and squares, and many impressive new buildings in the modern style make Kharkov an interesting city to visit. Its greatest architectural achievement is the House of State Industry, which was the largest office building in Europe at the time of its opening. Two famous museums display unrivalled collections of Ukrainian art, both early and modern. There are also several research institutions, including the university (founded 1803), now called the Institute of People's Education.

The population is mixed. Ukrainians and Russians predominate, with a sprinkling of Jews, Germans, Chinese, Tartars, Khirgiz, and many others. Since 1920 the population has more than doubled, it is now 833,000.

Khartum. (Pron kar-tōom') This city (also spelt Khartoum), capital of the Anglo-Egyptian Sudan, lies at the junction of the Nile with its tributary the Blue Nile. On the west of the main stream (which here becomes the White Nile) is the larger

city of Omdurman, the old Dervish capital. There is a railway line from Khartum to Wadi Halfa on the northern boundary of the Sudan, while air-liners call here en route for Egypt and all parts of British Africa. The city was founded in 1820, but was destroyed by the forces led by the Mahdi and his successor, the Khalifa, in 1885. During the siege of the city General Gordon (qv) was killed. Lord Kitchener obtained his appellation "Kitchener of Khartum" from his successful recovery of the city at the head of an Anglo-Egyptian army in 1898. During the present century it has been rebuilt on modern lines. The present-day population is 46,000.

Kidd, WILLIAM (1650?-1701) Of all the many reckless sea-rovers who flew the "Jolly Roger" at the mastheads of their pirate ships, made their poor victims "walk the plank," and buried their ill-gotten treasures on lonely isles, Captain Kidd is the most famous—though one of the least typical, despite the many legends that have grown up about his name.

William Kidd was a son of a Scottish minister, and followed the sea from youth. In the war between the English and the French, during the reign of William and Mary, he became known as the bold captain of a privateer in the West Indies. British commerce then suffered greatly from marauding pirates, so, at the request of the British governor of New York, Kidd received two commissions from the king addressed to "our trusty and well-beloved Captain Kidd"—one for suppressing piracy and the other recognizing him as a privateer against the French. With his 30-gun ship



NEW WAYS IN KHARTUM

Khartum, the capital of the Anglo-Egyptian Sudan, was 40 years ago a primitive town of mud houses without any of the amenities of civilization. Today, as this photograph shows, it is a well-laid-out city, with broad streets and modern buildings.

'Adventure,' and his crew of 155 men, he set sail jauntily for Madagascar and the Red Sea region, the chief haunts of the pirates.

His troubles now began. No pirates were found, cholera killed off many of his crew, the ship grew leaky, and supplies began to give out. Then, apparently, Captain Kidd followed the advice of his discontented crew and himself turned pirate. He took several small Moorish vessels, was defeated by a Portuguese man-of-war, and in turn captured a Portuguese and an Armenian vessel.

But at last the day of reckoning came. In 1699 he deserted the leaky old 'Adventure,' boarded one of his prizes, and headed for America. Learning that he had been proclaimed a pirate, he sent to the governor a part of his booty. He was arrested in Boston, where he landed, and sent to London for trial. There he was convicted of murder by killing a mutinous sailor. After a trial in which the evidence was inconclusive and during which he kept protesting that he was "the most innocent person of them all," he was pronounced guilty also of piracy. He was hanged at Execution Dock, Wapping, where his body long hung in chains.

Kidneys. The kidneys of the human body constitute

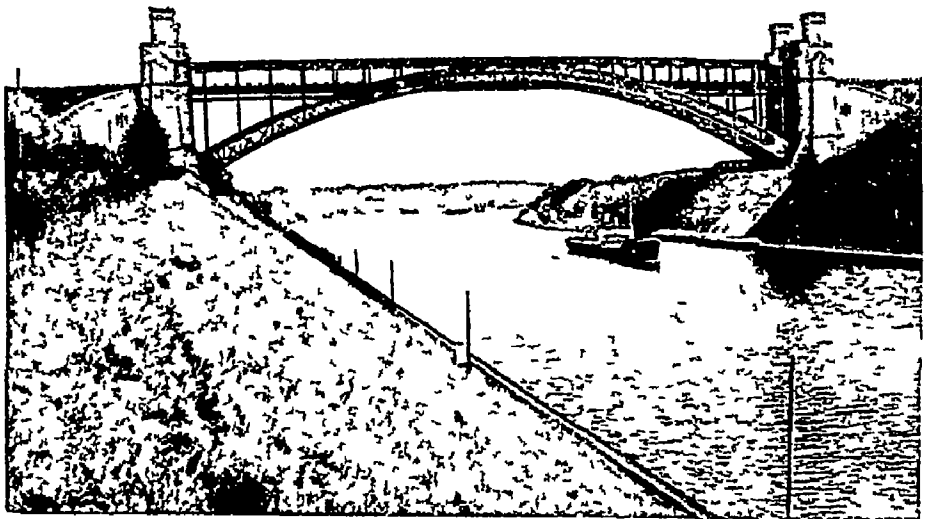
the main purifying and filtering plant for the blood. The pure blood remains in the system, and the poisonous waste is filtered off through their direct agency.

The kidneys are bean shaped, about 4½ inches long, 2½ inches wide, and 1½ inch thick, one situated on each side of the spinal column, directly under what we call the "small of the back." The right kidney is placed slightly lower than the left, to make room for the liver above. The function of the kidneys is to collect waste matter from the blood and excrete it via the bladder in the form of urine.

The kidneys, which are protected by a mass of fat, consist of numerous minute tubes gathered into pyramids. The cells which line these tubes collect the waste from the blood

as it passes over them. Ordinarily the kidneys throw off some three to four pints of urine daily, in which is carried spent material that would otherwise be harmful. Anything, therefore, which interferes with the activity of these organs means the accumulation of poisonous waste matter in the body and immediately brings on serious sickness or even death.

It is this fact which makes disease of the kidneys so serious. "Bright's disease," for instance, is an inflammation of the kidneys which interferes with their normal activity and causes them to throw off albumen. Unless this condition is cured, the waste poison called *urea* accumulates in the blood with fatal results. Sometimes chalk-like stones (calculi) are formed



STEAMING ALONG THE KIEL CANAL

Cutting through the peninsula that separates the North Sea and the Baltic, the Kiel Canal is of enormous value to Germany as an easy outlet under her own control, into the high seas. The bridge over it in this photograph is at Levensau, and is about 140 feet high the masts of ships using the canal being limited to a height of 131 feet above the water line.

Photo German State Railways

in the kidneys, and these may block up one or both ureters, as the tubes leading from the kidneys to the bladder are called. A blocked ureter is a dangerous condition because the kidney above becomes paralysed in function. If both ureters become blocked the danger is increased and death is inevitable unless the obstructions are removed at once.

Almost all diseases have some effect upon the kidneys, and one of the methods most relied upon by the modern physician in determining the general health of a patient and detecting unsuspected trouble is to subject the urine to chemical analysis.

Kiel Canal. The great peninsula forming Schleswig-Holstein in Germany and Jutland in Denmark was long regarded as a hindrance to



KIEV, HOLY CITY OF OLD RUSSIA

Kiev is one of Russia's most ancient cities, having been founded in the 5th century. The height of its modern buildings—sometimes six or seven storeys—is unusual for Russia. The Pioneer's Square, seen above, shows very well the fine proportions of some of these buildings. *Interstate Press Pictures Ltd*

navigation between the North Sea and the Baltic, and the possibility of a canal had been discussed at least 500 years before the great Kiel Canal was first opened in 1895.

The canal extends sixty-one miles, between the estuary of the Elbe on the North Sea and Kiel Bay on the Baltic. As the size of battle-ships increased, the German Government felt compelled to widen and deepen the Kiel Canal. The work, which was carried out at a cost of about £11,000,000, was completed in 1914 and the canal became 36 feet deep, with a surface width of 331 feet.

In 1939 it was decided to reconstruct and widen the canal to allow ships to pass in each direction, but the outbreak of war prevented the work being completed.

Kiev, (Pion kē'-yef), Russia. One of the most fascinating cities in Russia is ancient Kiev, on the river Dnieper, metropolis of the Ukraine Socialist Soviet Republic. The exact origin of the city is lost in legend, but it is certainly one of the oldest settlements in eastern Europe. Yet, despite its ancient aspect, Kiev is modern, too, with its busy wharves, smelting works, flour mills, sugar refineries, distilleries, and tobacco, leather, glass, and other factories.

There are three distinct parts of Kiev—the low-lying business section, called the Podol, which includes the large Jewish quarter; old Kiev, crowning the highest of the many hills; and, on Pechersky Hill, the world-famous monastery, or Laura, with its caves of cells founded in the 11th century.

Formerly the Laura was like a city in itself, with walls and towers, streets of cells, inns, churches, printing press, and schools. Thousands of pious Russians made annual pilgrimages to

it before the Revolution. Some monks spent their entire lives in the cave cells.

In old Kiev is the lovely cathedral of St. Sophia, famous for its golden topped bell tower which is visible for miles across the country. It is believed to be the oldest church in Russia.

Kiev was founded before the 5th century, and in the Middle Ages was rich and famous. Late in the 10th century it was the capital of the Grand Duke Vladimir, who was baptized a Christian, and made Kiev the home of the Greek Church in Russia. The Mongols sacked it in 1240. Kiev passed under Russian sovereignty in 1686. It saw

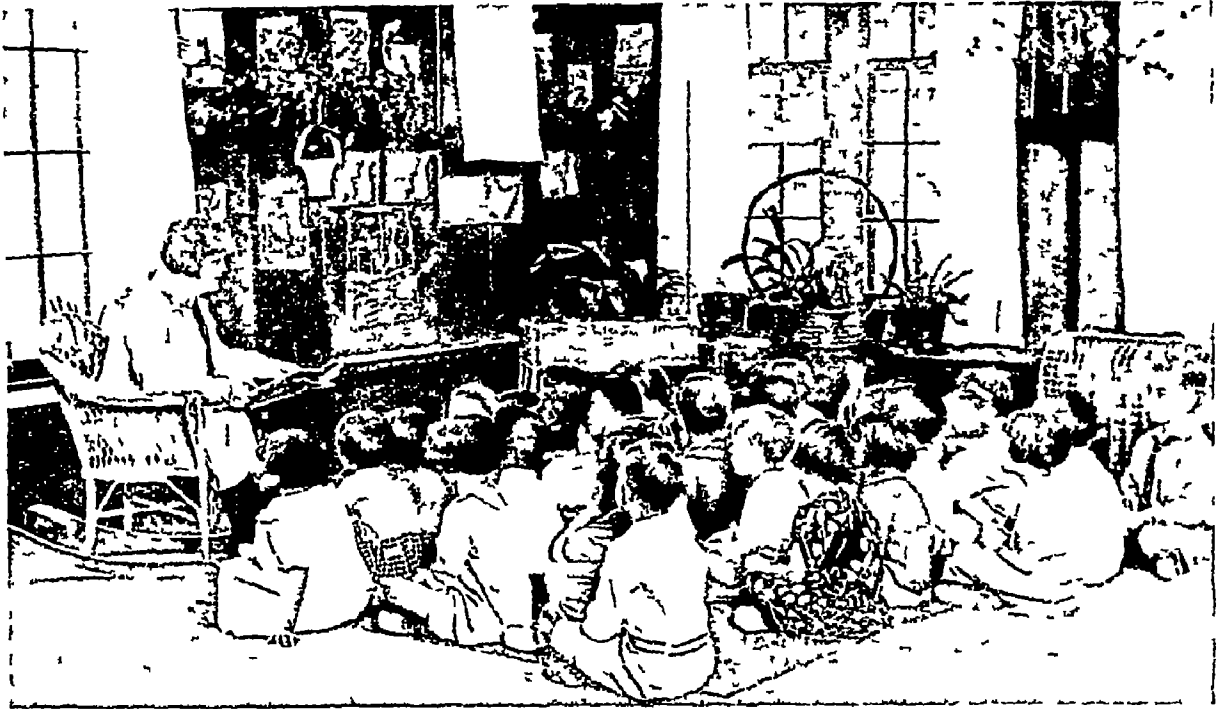
much fighting during 1914-1920. The population of Kiev is about 846,000.

Kildare, Co. of EIRE. Lying in the central plain of Ireland, this rich pastoral county in the province of Leinster embraces the Curragh, probably the foremost centre of racehorse breeding in the world. Two-thirds of the land



THE ROUND TOWER OF KILDARE

This old round tower near the church at Kildare is 108 feet high. It is in good condition, but has been rather spoilt by the addition of a modern battlement. The doorway has a remarkable Romanesque ornamentation. *Photo W. Lawrence*



STORY HOUR IN A KINDERGARTEN

A group of little tow-heads, red-heads and curly-heads listen with never a wriggle to the adventures of Peter Rabbit. Tomorrow they will act the story. It is near Easter time, and the pupils in this kindergarten have been making pictures of bunnies and chickens. Kindergartens arrange work to fall in with the seasons and with special events.

is given up to grass, and on the verdant pastures fine cattle, sheep, pigs, and poultry are raised in great numbers, the remaining one-third is cultivated for oats, barley, turnips, and potatoes chiefly. Many fine specimens of the ancient round towers—probably towers of refuge against invaders—are found throughout the county, the one in Kildare town being 108 feet high. Kildare is the county and market town, with a population in 1926 of 2,116. Agriculture and pedigree stockbreeding are the main industries. The area of County Kildare is about 645 sq miles and the population 57,737.

Kilken'ny, Co OF EIRE. In the province of Leinster and forming the south eastern end of the great central plain, Kilkenny is one of the most interesting counties in Ireland, and one of the few to possess mineral wealth—though on a small scale. Anthracite coal is worked at Castlecomer, rich hematitic iron and manganese are found in several places, and at Knocktopher copper is mined. There are also valuable limestone quarries, while marl, a mixture of clay and lime carbonate possessing high fertilizing values, is plentiful.

Agriculture is, however, the chief occupation. Barley, oats, potatoes, and turnips are the main crops. Stock-raising is an extensive industry, cattle, sheep, pigs, and poultry being reared in large numbers. Subsidiary manufactures are marble polishing, brewing, distilling and milling. Kilkenny, the county town, with population (1926) 10,000, is a cathedral city, the cathedral

of St Canice, from which the city takes its name, dating back to 1255. It is the largest, next to St Patrick's pro cathedral, Dublin, in Ireland. Kilkenny county has an area of about 800 sq miles, and a population of 68,567.

The saying, "to fight like Kilkenny cats," that is, till only their tails are left, may have originated in the disputes that raged for centuries between the two divisions of the city, Englishtown and Irishtown.

Kincard'ineshire, SCOTTISH Co. Known also as the Mearns, Kincardineshire is 383 sq miles in extent and has a population of 39,000. It lies on the east coast between Aberdeenshire and Angus, and is in general a rugged, picturesque region of mountain, forest, and moor. Stonehaven (population, 4,000) is the county town and chief fishing port; inland, near the river Dee, is Banchory, noted for its shortbread.

Kindergarten. Does it make any great difference what a child does or learns before he is six years old? Friedrich Wilhelm August Froebel (1782–1852) believed that it did, and, in order to work out his ideas regarding infant education, he opened a school in the little village of Blankenburg, Germany, in 1837. Two years later he named this institution *Kindergarten* (garden for children), in order to distinguish it sharply from all ordinary types of schools, and to suggest the idea of education as a natural growth upon which it was based. Froebel's school and educational theory

KINDERGARTEN



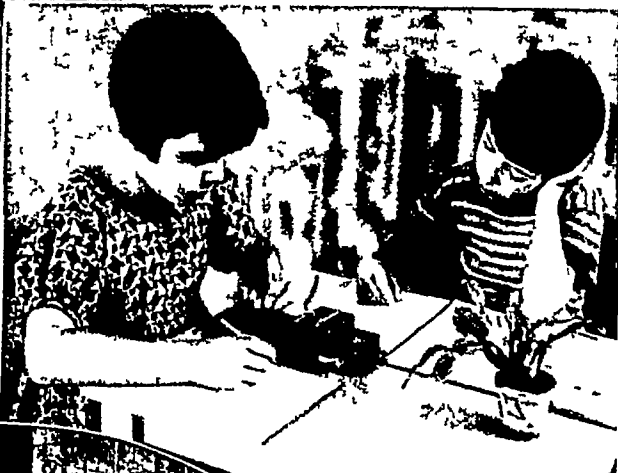
yellow, second, a box containing three objects all of hardwood—a ball, a cube, and a cylinder. The third, fourth, fifth, and sixth gifts consist each of a cube subdivided into small geometrical solids, cubical and brick-like blocks. The seventh gift is a set of thin wooden or cardboard tablets, triangular and rectangular in shape, the eighth, a box containing small straight

proved so successful that today there is no corner of the civilized world where kindergartens have not been organized.

The kindergarten is not a *play* school, although it gives a large place to play. That is because play usually occupies a large place in infancy and childhood, and because play is Nature's own and most important method by which children learn and develop physically, socially, morally, and intellectually. The purpose of education, Froebel believed, is to aid the child's nature in its efforts to express itself. The child's early yearnings for self-expression are vague, undirected, and unintelligent. He knows neither his capacities, his needs, nor his interests. It is the task of the school and the teacher to aid him here.

The kindergarten is designed to educate the child by natural methods—by providing an environment which will make him conscious of his present needs, interests, and capacities, and which will provide him with the materials and opportunities necessary for expressing and satisfying the same. The materials and activities which the kindergarten uses are generally grouped as follows: (1) gifts, (2) occupations, (3) games, (4) songs, (5) stories.

The gifts are groups or sets of playthings, ten in number and geometrical in form. They include, first, a box containing six wooden balls—blue, red, violet, orange, green, and

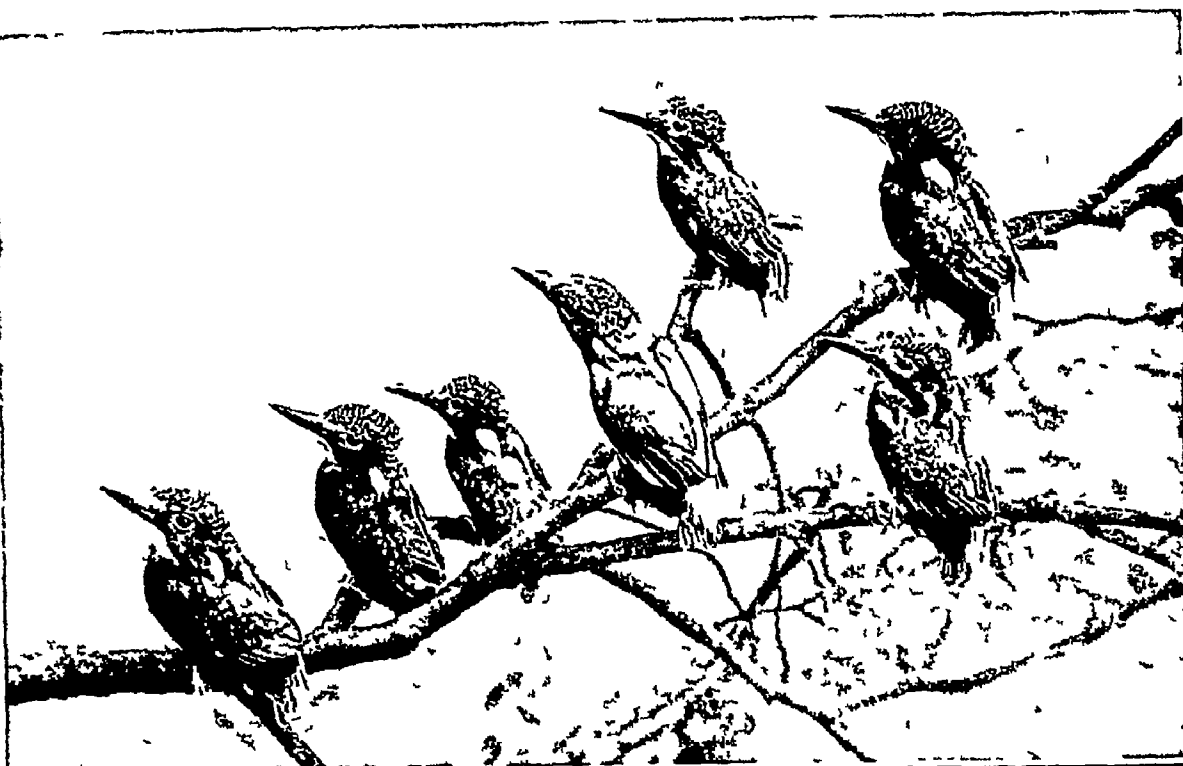


Busy shoppers and clerks in the make-believe grocer's shop, upper left, are sure to pick up the first principles of arithmetic as they earnestly count pennies and give change. The serious little girl above is absorbed in working a counting machine, while the boy studies a self-instruction book. One of the favourite games of the kindergarten is "Blind Man's Buff," in which the blindfolded child runs his hands over any playmate he catches and tries to guess his identity—not so easy to do in these days of sleek bobbed heads.



LEARNING BY PLAYING IN THE KINDERGARTEN

The three upper photographs in this page show how largely playing enters into the methods of teaching in a kindergarten. That immediately above is an example of how the children are encouraged to find out things for themselves. The boy and girl are trying to see how a kitten laps up milk.



Photos above Arthur Brook right Fox

KINGFISHERS BESIDE THEIR BANK SIDE HOME

HERE are two splendid photographs of the kingfisher, finest in plumage of all our native birds. Above, a lusty family of seven youngsters are neatly arranged on the branches of a tree certainly not far from their home, for they are not yet able to fly far. Notice that their tails never large in this species are as yet hardly developed at all. Young kingfishers often sit like this, but you have to be very quiet if you want to get such a good view as this without frightening them. On the right is a single kingfisher sitting outside the entrance to its home. It is strange to think that such a brilliantly plumaged bird nests in deep dark and dirty holes, but this is a fact. The nesting site consists of a burrow, excavated in the river's bank at the end of which a bare chamber forms the nest. Moreover, this tunnel home is often lined with fish bones and similar refuse with an evil smelling stream of ooze flowing out and down the bank.



KINGFISHER—MOST BRILLIANT BIRD OF BRITAIN



W S Berridge

All the members of the kingfisher tribe are birds of brilliant plumage, and our own representative is one of the finest Greenish-blue and red are his chief hues, and his feathers glitter in the sun so that when he flies by it is as though a flash of blue were passing along the stream

To face page 2385

coloured sticks, the ninth, circular and semi-circular rings, the tenth, a box of seeds, shells, or fine pebbles, representing points

By using the gifts as playthings the child learns to distinguish colours, forms, numbers, lines, and textures. They are designed to furnish him with an alphabet of sensation, by which he may spell out things and his own experiences in the world into which he is born, but which at first is to him a book which he does not understand. They also serve as materials through which the child expresses the ideas and feelings aroused by contact with this world, for example, he uses his little blocks to build a house, thus expressing an idea, or with the sticks of the eighth gift he outlines a pattern or picture on his little table.

A wonderful and almost immeasurable wealth of music, songs, games, and literature has grown up around the kindergarten. Before the time of Froebel the child's intellectual world was poor, containing little besides slightly diluted or made up materials taken from the literature and music of adults. The kindergarten has created a new world and a new spiritual heritage for tiny tots. It has enabled them to learn very necessary things (lessons that will be useful in later life), in a way that suggests play to them. (See Child Development, Education, Froebel, Friedrich Wilhelm, Schools)

Kingfisher. One day, as you walk by some stream or river, you may hear a sudden shrill cry, almost like a mechanical whistle, then, if you keep alert, you will see a sudden brilliant flash of blue and green, darting down the watercourse—a kingfisher (*Alcedo ispida*). This is our most brilliant bird, but, besides being handsome, he is a wonderful diver. By his diving he gets his living. From a perch many times his own height above the water, he falls in a sudden dive, seizes some luckless fish in his long beak, flies back to his perch, tosses the fish into the air and swallows it. And as this may happen many times a day, and the little fish may be trout, the kingfisher is apt to be unpopular where fish are preserved. But aquatic insects, luckily, and other creatures form a large part of the diet.

Many beautiful legends are connected with the European kingfisher, which was anciently called the halcyon. An old belief was that the seven days preceding the shortest day of the year were used by these birds to build their nests which, it was thought, floated on the water, and the seven days following were devoted to hatching the eggs. During this period, "the halcyon days," the ancients believed the sea was always calm. Hence "halcyon" to describe calm peaceful days.

These birds, of which there are some 200 species, have disgusting nesting habits. Our



KINGFISHER'S CATCH

Here is a fine snapshot of a kingfisher caught in the act of returning to his perch on a dead branch and holding in his beak a small fish, which was unwise enough to show itself as the bird sat poised above it. Kingfishers often have a number of favourite perches above the streams in which they fish.

own kingfisher breeds in a hole in the river bank, laying its round white eggs in a chamber at the end of a long tunnel. This tunnel acts as a drain for all the mess and slime which dribbles out from the nest, augmented by innumerable fish bones. Foreign kingfishers include the American belted kingfisher, and the famous "laughing jackass" of Australia.

'King Lear.' By many judges this master tragedy of Shakespeare is ranked as the finest piece of dramatic literature in the world, but it is rarely acted because it is harrowing throughout. Lear, a headstrong old sovereign of ancient Britain, divides his realm into three parts, and then calls on his three daughters to receive each her share according to the love she professes for him.

Goneril and Regan so insult reason with their extravagant avowals of love that the youngest daughter, simple honest Cordelia, quite disgusted with them, states her own dutiful love too modestly to please the proud old king. He casts her off penniless, so that she would have been poor indeed had not the King of France claimed her as his bride. But the elder daughters, secure in the possession of his wealth, now treat Lear with contempt and cruelty. Shorn of every kingly dignity, denied even the respect due to a father, the old man rushes out into the tempestuous night, lest his brain burst with its unsupportable storm of rage and grief. In the pauses of the tempest we hear his terrible curses and the bitter pointed chatter of his faithful fool.

One gleam of peace breaks upon his sin and suffering. This is when Cordelia and poor sick



KING LEAR COMFORTED BY CORDELIA

There is unrelieved tragedy in Shakespeare's play, "King Lear," but the deep devotion of Lear's daughter to her father breaks through the gloom like a ray of sunshine piercing a grey sky. This illustration, reproduced from a painting by G. W. Joy, shows Cordelia comforting her father in the prison to which he and she had been taken after the defeat of their armies by that of her sisters, Goneril and Regan.

City Art Gallery, Leeds

Lear are reunited. But their armies are defeated, and Lear is next seen bearing the dead body of Cordelia from prison, where her cruel sister has caused her to be hanged. The guilty daughters perish and their party is overthrown, but Lear dies of a broken heart.

Shakespeare is believed to have written this play between 1600 and 1608.

Kingsford-Smith, Sir Charles Edward (1897-1935) "Smithy" is generally acknowledged to have been the finest pilot of the post-War years, and his disappearance in November 1935, while attempting to crown all his previous records, was a sad loss to the flying world.

Like many other famous airmen, Kingsford-Smith was an Australian, being a native of Brisbane. He served in the World War with distinction, and afterwards took up commercial flying. His first outstanding feat was to fly round Australia in 1927, but world-wide fame came in June 1928, when, with three companions, Kingsford-Smith piloted the Southern Cross over the Pacific from the U.S.A. to Australia, and also flew the Tasman Sea to New Zealand and back. In the following year, and in the same machine, he made a record flight from Australia to England. 1930 saw a triumphant crossing of the Atlantic, and also a record flight back to Australia in a light machine. In 1931-2 he commanded the first experimental all-Australian mail plane to England and back.

Yet another record flight to Australia followed in 1933, and the first crossing of the Pacific to

the U.S.A. in 1934—all the result of careful preparation and superb piloting and navigational skill. This brilliant career was cut short when Kingsford-Smith—who had been knighted in 1932, and had reached the honorary rank of Air Commodore in the Royal Australian Air Force—was lost in the Bay of Bengal while attempting an even faster flight in a small single-engined machine without wireless equipment.

Kingsley, Charles (1819-1875). Known chiefly in his own day as a Radical writer and clergyman, Charles Kingsley was far more versatile than those who knew him only as a reformer would have believed. This spare, hawk-like parson was also novelist, naturalist, professor, and poet.

The son of a clergyman, Kingsley was born June 12,

1819, in Devonshire. He attended King's College in London after his father had obtained a rectory in that city. Later he entered Cambridge University. In 1842 he went as curate to the parish of Eversley, in Hampshire, and soon was appointed rector. He died January 23, 1875, and was buried at Eversley.

Deeply interested in social and economic problems, Kingsley risked his position in the Church by his speeches and writings on behalf of the working classes. "Yeast" (1849) and "Alton Locke" (1849) are two of his novels dealing with social problems.

Though Kingsley's years (1800-60) as a professor of modern history at Cambridge were unremarkable, he wrote several novels on historical subjects for which he is chiefly remembered. "Westward Ho!" (1855) tells the story of a famous Devonshire knight making history in the stirring days of Elizabeth. "Hypatia" (1853) deals with the former glories of Alexandria, in Egypt. "Hercward the Wake" (1866) is a tale of Saxon England and the struggle with the Normans.

For his children Kingsley wrote delightful nature stories which have become the property of children everywhere. Among them are "Madam How and Lady Why" (1869) and "The Water Babies" (1863). The latter is a fairy story and nature story combined.

Charles Kingsley's brother Henry (1830-1875) was also a writer, his best-known book being the novel "Ravenshoe."

TOM and ELLIE

The Story of the WATER-BABIES

MANY years ago there lived a little chimney-sweep named Tom, who had to climb up the insides of chimneys to sweep away the black, choking soot.

One day Tom and his cruel master, Mr Grimes, had to go to a big house to sweep the chimneys. On their way they met a poor Irishwoman. At the bottom of a hill Grimes dipped his dirty head in a stream. Tom wanted to do the same, and Grimes began to beat him. "Stop!" said the Irishwoman. "Those that wish to be clean, clean they will be." Then she disappeared.

At the house Tom went up one of the chimneys, but came down a different one, and saw a pretty little girl lying in bed. Then he caught sight of himself in a mirror. When he saw how dirty he was, he burst into tears, and turned to rush back up the chimney. This roused Ellie, the little girl, who screamed. Poor Tom climbed out of the window and ran away as fast as he could.

Through woods and across fields dashed Tom. When, at long last, he reached a cottage, an old woman took care of him. He fell asleep and dreamed

that the little girl was crying "Go and be washed," and that the Irishwoman was saying

"Those that wish to be clean, clean they will be." Then he cried out "I must be clean!" Immediately he found himself by the stream. He took off his clothes and got into the water.

The Irishwoman also stepped into the water, and the fairies of the stream came and took her away, for she was their Queen. She told them about Tom,

so they took him away and turned him into a water baby while he was asleep.

Tom had many adventures as a water-baby. One day he was sitting on the wet rocks when Ellie walked by. She tried to catch Tom but fell and struck her head. She was carried home, and for days lay very still. One night the fairies brought her a pair of wings and she flew away.

Tom had swum away and he made friends

with dozens of other water-babies. Tom rather liked to tease, and the other children warned him of Mrs. Bedonebyasyoudid. When she came she told Tom that if he were good her sister, Mrs. Doasyouwouldbedoneby, would help him. So Tom tried to be good, but it was no good, and when Mrs. Doasyouwouldbedoneby came she could not touch Tom because he was all over prickles, with his naughty temper. He

wanted his prickles taken away, so Mrs. Doasyouwouldbedoneby asked Ellie to help, and she set to work to cure Tom of his prickles.

Every weekday she taught him, but on Sundays she went away. Tom wondered where Ellie went on Sundays. But she told him "Those who go there must first go where they do not like, do what they do not like, and help somebody they do not like."

At last Tom decided to do this, and he set out. He finally came to a very ugly building where Grimes was stuck trying to get out of the top of a chimney. His tears fell so fast that they washed the mortar from the bricks, until the chimney fell down and Grimes was free. Then Tom was allowed to go back to the water babies, and went home with Ellie on Sundays.



' She set to work to cure Tom of his prickles



They turned him into a water baby

A PRINCE of BRITISH STORY-TELLERS

If you have read "Stalky & Co" you already know something about Rudyard Kipling's life, for he is "Beetle" in that book But whether you have or not, you will want to read this life-story of the great writer

Kipling, RUDYARD (1865-1936) On Dec 29, 1865, while Victoria was ruling the Empire and the United States had just come to the end of its Civil War, a boy was born in Bombay who was to win fame as "the spokesman for the Anglo-Saxon breed"

The first five years of Kipling's life were spent in India. Much of the vividness and realism of the "Jungle Books" is probably due to the impressions that came to him, before he

could talk, of the strange primitive country that lay beyond the cities and the highways of British India. He and his little sister had a native nurse, and her tales of the jungle animals lingered in his memory, to crystallize later in Mowgli and Shere Khan and the grey wolves. Like most English children born in foreign lands, he was sent to England to be educated. Too young for a boarding school, he was left in the care of a woman who seems to have been the worst possible guardian for a sensitive boy accustomed to sympathy and understanding. Nearly everything that a small boy wanted to do was to her

a "sin." As a punishment, even reading was forbidden, and Kipling almost ruined his eyes by devouring in secret every book he could lay his hands on. Those six years in that "House of Desolation," in which—he says rather sadly—"there was so little love and so much Bible," are described in a story called "Baa Baa Black Sheep."

At last his parents came home from India on leave, and they remade his world. Glasses helped his weak eyes, and he was carried off to a summer in Devonshire with his father and mother and his lively young cousins.

At the end of this holiday he was sent to the United Services College, the well-known school for sons of army officers at Westward Ho, in Devonshire. His years there are recorded in "Stalky & Co", in which Kipling is

"Beetle." "How we, the originals of Stalky, McTurk and Beetle, came together I do not know," he says. "But our triple alliance was well established before we were thirteen." His first poems, published privately by his father were written here.

When he was just short of 17, far more mature than most boys of his age, he returned to his family in Lahore, wearing proudly a small moustache which his mother promptly ordered

him to remove. He became a reporter on the one daily newspaper in the Punjab, the "Civil and Military Gazette." In his autobiography Kipling calls this interval "Seven Years' Hard." To get material for his newspaper articles, he travelled round India and came to know the country as did few other white men.

It was now that Kipling began to write the poems and short stories about the British soldier in India that were to establish his reputation as a writer. "Plain Tales from the Hills," "Soldiers Three," and "Barrack Room Ballads" are known now wherever English is spoken. The slim little



KIPLING IN HAPPY MOOD

Rudyard Kipling was not seen much in public life, for he was shy from his boyhood up. But in October 1923 he was elected Lord Rector of St Andrew's University, here he is acknowledging the students' cheers. Behind him (right) is his cousin, Mr Stanley (later Earl) Baldwin.

volume called "Departmental Ditties" he edited, printed, published, and sold himself.

In 1887 Kipling was transferred to a larger and more important newspaper at Allahabad, the "Pioneer." Here he had more time for creative writing, and he made the most of it. In 1890, eager to find a publisher for his tales and conscious that he had earned a holiday, he set sail for England, going by way of Japan, China, and North America. At length the vital, dramatic stories and the singing verse fired the public imagination. The books sold rapidly and his words became a part of the common speech in both England and America.

Two years later he married an American girl, Caroline Balestier, and started off with her on another holiday trip, this time round the world. After their honeymoon Kipling and his wife

settled down in Vermont, U.S.A. In this house their first child was born, and there Kipling wrote the tales that were to make up his "Jungle Books"

Then, after four years in America, the Kiplings decided that their real home was in England. They rented a little house in a Sussex village near his uncle, Edward Burne Jones, and his cousin Stanley Baldwin. There in August, 1897, their only son, John, was born.

The story that we know as "Kim" had been in Kipling's mind for years. Now, stimulated by his father's keen interest, he began to write it. Long visits to South Africa, where they formed a friendship with Cecil Rhodes, and another trip through North America varied the Sussex life.

One day his cousin, Ambrose Poynter, said to him, "Write a story about Roman times here." So "Puck of Pook's Hill" and "Rewards and Fairies" were begun. Each story is complete in itself. Together they form a chain of "scents and sights and sounds" that reach to the very heart of England.

In 1907 he was awarded the Nobel Prize for literature and he and his wife went to Stockholm to receive it from the Swedish King. The World War brought him personal tragedy. His only son was killed fighting in France with the Irish Guards. In John's memory Kipling wrote a history of this famous regiment, and the dedicatory poem has a refrain that is like a song once heard and never quite forgotten.

Old Days! The wild geese are fighting!
Head to the storm as they faced it before!
For where there are Irish there's bound to be fighting,
And when there's no fighting it's Ireland no more!
Ireland no more!

With the social and political changes that followed the war Rudyard Kipling had little sympathy. More and more he withdrew from the active scene, spending the greater part of the year in his Sussex farmhouse. When he was nearly 70 years old, he sat down to write his autobiography, "Something of Myself." It was published after his death.

Kipling died on January 18, 1936, in the same month as King George V.

Rudyard Kipling's Story of Mowgli

SUPPOSE that you were a small boy of eastern India whose home was on the edge of a great jungle. Suppose that you were sitting one night before a camp-fire with your mother and father, and that suddenly, out of the dark, came a tiger, black and tawny and very fierce. Would you have been frightened? Mowgli wasn't.

Shere Khan, the Tiger, was hungry, and when he saw Man-flesh he jumped, forgetting the fire. That is how he burned his toes. And because he burned his toes, and had to stop to lick them, the baby's mother and father had time to run. Left to himself, and just old enough to walk, Mowgli crawled away through the long grass.

Father Wolf was stretching himself after a nap when he heard a rustling outside his cave. "Look!" he called to Mother Wolf—"a Man's cub." Then with careful teeth that did not even scratch the soft skin, he picked it up and carried it into the cave.

"A Man's cub went this way," roared Shere Khan, his massive head and shoulders blocking the entrance to the cave. "Give it to me."

Mother Wolf sprang forward, her eyes blazing in the darkness like two green moons.

"The Man's cub is mine. He shall live to run with the wolf pack and to hunt with us, in the end he shall hunt thee! Go!"

Mother Wolf was very fierce when she was angry, and Shere Khan skulked away, but in his heart was hatred.

"The Man's cub must be shown to the Pack," said Father Wolf, when the brown baby had settled down to a rough and-tumble play

with the wolf cubs. "Wilt thou still keep him, mother?"

"Keep him!" she gasped. "He came naked, by night, alone and very hungry, yet he was not afraid! Certainly I will keep him. Lie still, little frog. O thou Mowgli—for Mowgli, the Frog, I will call thee. The time will come when thou wilt hunt Shere Khan!"

On the night of the Pack meeting, when the three young wolf cubs were old enough to run about a little, Father and Mother Wolf took them to the Council Rock. The Council Rock was a bare hill-top where the wolves met, and where the cubs must be shown to the Pack before they could be accepted by the Free People. Into the centre of the circle which they formed Mowgli was thrust forth.

"Ye know the Law! Look well, O wolves!" Akela, the Lone Wolf, who was their leader, cried in recognition of the new cub.

A roar came from behind the rocks. It was the voice of Shere Khan, demanding his prey. Fearful of the great tiger, one of the young wolves spoke up, asking why this man-cub was taken into the tribe.

Now there is a Law of the Jungle that says, when there is a dispute concerning the acceptance of a cub, two members of the jungle who are not its mother or father must speak for it.

Up rose Baloo, the Brown Bear, teacher of the wolf-cubs, and he spoke for Mowgli. Then came Bagheera, the Black Panther. He quoted the Law that allows a price to be paid for any cub that is objected to by the Pack. In payment for the Man-cub Bagheera gave a bull, newly

KIPLING

killed This was good meat for the young wolves So Mowgli was taken into the Pack Mother Wolf had nursed him with her own babies, Baloo, the sleepy Brown Bear, taught him the Law of the Jungle, and Bagheera the Panther was his friend

As he grew up Mowgli learned to hunt and to protect himself, and to climb trees like a monkey for nuts and fruit and honey Baloo taught him the *Stranger's Hunting Call* that he must use when he sought food outside his own grounds, the *Master Words of the Jungle*, that he might claim protection with the Birds and Snake

Now the Red Flower is Fire, of which all animals live in deadly fear, and which only Man can tame That same night Mowgli went down into the village Pressing his face close against a window, he watched the boy who lived there put some of the glowing coals from the hearth into a basket lined with clay Mowgli walked in, took the basket from him, and disappeared into the dark

When the Pack met at the Council Rock, Akela, for twelve years leader of the Free People, lay still, for he had missed his kill, and the Law said that he must die Mowgli sat up very



"Listen, you wolves!

I, the Man, have here a little of the Red Flower which ye, dogs, fear!"

People and all four-footed beasts He could swim as well as he could run and he could climb as well as he could swim So he grew strong and brown and wise

"Little Brother," said Bagheera the Panther one day in Mowgli's twelfth year, "how often must I tell thee that Shere Khan the Tiger is thine enemy?" But Mowgli only laughed, fearing nothing

"The young wolves are following Shere Khan, who gives scraps from his kill," Bagheera continued "Akela the Lone Wolf is growing old, when he misses his kill—and the time is very near—he will no longer rule the Pack The others will kill him, for that is the Law Then they will turn on thee, Little Brother Shere Khan is urging them"

At this Mowgli's black brows came very close together, because he knew this was the truth

"I have it," said Bagheera, "go thou down to the Man's huts in the village and get some of the Red Flower Thus wilt thou be master"

straight, the pot that held the Red Flower clasped between his knees, Bagheera the Panther at his side

"He is my prey," snarled Shere Khan "Give him to me!"

"Yes, give the Man-cub to Shere Khan," repeated the young wolves, for they hated Mowgli Restlessly they circled round him, and Shere Khan roared hungrily

"Now is the time," whispered Bagheera the Panther, and Mowgli rose, holding the fire pot in his hands

"Listen, you wolves Ye have said often that I was a Man I thought myself your brother, and would have stayed with ye always But now that ye have turned against me, it is not yours to say what shall be done I, the Man, have here a little of the Red Flower, which ye, dogs, fear"

"Listen," he called, staying his hand, "Akela goes free, to live as he pleases Ye shall not kill him because that is not my will I go to the



MOWGLI DEFEATS HIS TIGER FOE

From the time of his adoption into the wolf pack, the boy Mowgli (the hero of Rudyard Kipling's "Jungle Book") had been dogged by Shere Khan the tiger. Shere Khan persuaded the Pack of the Jungle Free People to expel Mowgli. But the boy went to the village and took some of the Red Flower (fire). Dipping a branch into this, he beat the tiger with it until he slunk away defeated. Then Mowgli left to join his human brothers, swearing that he would return later and lay out Shere Khan's hide on the Council rock. And thus, indeed he did, and the manner of it is shown in the next page.

By Courtesy of Macmillan & Co. Ltd



MOWGLI LEADS THE CHARGE OF THE BULLS

How Mowgli took his revenge on Shere Khan, the tiger, is told in the story "Tiger! Tiger!" While living with men, Mowgli was often sent out to watch a herd of water-buffaloes, and one day the wolves, Akela and Grey Brother, came to tell the boy that Shere Khan was lying asleep in a steep-sided and narrow ravine. This was Mowgli's chance! The wolves divided the buffalo herd, driving the cows and calves to the bottom of the ravine, and the bulls to the top. Then Mowgli mounted Rama, the bull leader, and the bulls charged furiously down the ravine. Shere Khan, prevented by the cows from escaping, was trampled to death.

By Courtesy of Macmillan & Co. Ltd

village to my own people When next I come to the Council Rock, I will come with Shere Khan's hide on my head" He strode off to say good-bye to Mother Wolf and his foster-brothers As he walked he wept and because he wept he thought he must be dying, for he had never wept before

The dawn was breaking when Mowgli went down the hillside, alone, to meet those things that are called men In the village he made signs to show that he was hungry The priest was called and a great crowd gathered He was taken home by a kindly woman, who fed and clothed him and made him sleep in a house But the house frightened and angered him, for it seemed like a trap He was sent out to herd buffalo with the other village children But it was tiresome business, and he longed to go back to the jungle

As he sat wearily making grasshopper houses and watching the wallowing cattle, Gray Brother, one of Mother Wolf's cubs, came to him

"Shere Khan waits for thee by the village gate this evening But he has eaten and is slow and drowsy from too much food"

"Then we shall catch him," said Mowgli "Tonight I shall have the skin of Shere Khan" With the help of Gray Brother and Akela, Mowgli divided the buffalo into two herds One herd was driven to the foot of the ravine where Shere Khan lay sleeping The other went to the head of the ravine The two herds formed a rough circle, with Shere Khan in its centre Down they dashed from either end, tumbling, sliding, bellowing When Akela and Gray Brother separated them Shere Khan lay dead

After Mowgli had stripped the tiger's body of its skin, he and the wolves herded the buffalo and drove them back to the village

"Sorcerer, wizard, enchanter! Get thee hence!" cried the townspeople as Mowgli neared the gates The children who herded with him had told the village folk how the wolf-boy had killed the terrible tiger, and how the wolves obeyed him So with twigs and stones and vile words the village people drove Mowgli back to the jungle

On the great skin of Shere Khan which lay spread on the Council Rock, Mowgli stood in the light of the full moon Around him the wolves circled, begging him to be their leader

"No," said Mowgli, for he was of Man's blood and wise, "I will not lead ye, now that ye are hungry and sore, for when ye are full-fed once more ye will turn on me I will stay in the Jungle, but I will hunt alone"

So Mowgli hunted only with the four wolves, his brothers, and lived a long life in the Jungle

Compiled from Kipling's "Jungle Book," by permission of and special arrangement with Mr. Kipling's Executors and Messrs Macmillan Ltd, holders of the copyright

Kirkcudbrightshire, SCOTTISH Co (Pron ker kōōb'-rī shēr) This Scottish county, situated on the Solway Firth, covers an area of 900 square miles, and is for the most part mountain and moorland There are districts where fine farms are to be found, particularly along the river valleys The Dee, a splendid salmon stream, is the most important river The county is rich in historical and romantic associations It was at the wild and picturesque Glen Trool that Robert Bruce defeated and drove out the English in 1307

The county town, Kirkcudbright (population, 2,311), lies on the estuary of the Dee The county's population is about 30,000

Kish, IRAQ The once majestic city of Kish is today only a mound of desolate ruins on the Mesopotamian plain it ruled some 5,000 years ago It lies between the rivers Tigris and Euphrates, 100 miles south of Baghdad, capital of Iraq Inscriptions found in the ruins state that it was "the first city founded after the Flood" As the earliest-known capital of the Sumerians, Kish is believed by many archaeologists to be the birthplace of civilization in the near East

Until as late as the time of Sargon (about 2750 B C) Kish dominated the Near East Then it declined, for the Euphrates changed its course Kish lost its power to Babylon, built on the new course of the stream

Excavations by the Field Museum-Oxford University Expedition, 1923-33, shed new light on the history of mankind Digging to virgin soil, 60 feet below the top of the mound, the expedition found remains of several cultures, from Neolithic times to the Christian era A band of alluvial soil, about 40 feet below the surface, indicated that Kish had been flooded about 3200 B C Many take this to be evidence of the great Flood described in Genesis Equally astounding was the discovery, below the flood stratum, of a four wheeled chariot This is the earliest known wheeled vehicle

Kitchener OF KHARTUM EARL (1850-1916) It was a merciless blazing day on the edge of the Egyptian desert A detachment of the British Army, which was vainly trying to rescue General "Chinese" Gordon, besieged at Khartum, had captured two Arabs and hoped to get from them some much needed information But the men pretended to be deaf, and Major Horatio Herbert Kitchener, who questioned them, could get nothing from them

An hour later a third Arab was thrust into the tent with the other two Presently the three men were exchanging confidences in voluble Arabic After a time the third Arab called the guard and demanded to be taken at once to headquarters It was Kitchener himself, who, in disguise, had used his expert

KITCHENER

knowledge of Arabic to learn from the two obstinate natives all that he wished to know

This incident shows clearly both the thoroughness and the resourcefulness of this British officer. Whatever could possibly be of service to him he had to know, and he left no stone unturned to accomplish this end. The attempted rescue of General Gordon failed, Khartum fell two days before the arrival of the relief force, and Gordon's head was set in the fork of a tree by the Mahomedan "prophet," the Mahdi. Fourteen years later Kitchener, then Sirdar—that is, commander of the Anglo-Egyptian army—defeated the Mahdi's successor at the battle of Omdurman (September 2, 1898), and a few days later he marched into Khartum and held a memorial service for Gordon.

This feat, which earned him a place in the English peerage with the title Baron Kitchener of Khartum—or "K of K," as he was popularly called—was no sudden spurt, but was the crowning of many years of unceasing effort in organization. He saw war as a great profession, where the better organized and equipped forces won, and he succeeded because of his attention to these elements.

Kitchener came of a military family, and was educated at the Royal Military Academy at Woolwich. In 1871 he fought as a private for France against Germany—anticipating the time, 43 years later, when he was to be an ally of France against the same enemy, as Britain's Secretary of State for War. As a subaltern in the Army he made the survey map of Galilee in Palestine, and served in Cyprus and Egypt.



EARL KITCHENER OF KHARTUM

When the Gallipoli campaign in the World War seemed to have reached a deadlock in August, 1915, Lord Kitchener went to the Peninsula to examine the situation for himself. He is here seen (centre) discussing its possibilities with General Birdwood, then in command of the forces in Gallipoli.

Imperial War Museum

Office. He was created an Earl and made Secretary of State for War. In this capacity he had charge of the transformation of the British Expeditionary Force of 160,000 men into an army of 5,000,000. He did more than any other

man in England could have done to find the raw recruits and quickly mould them into a powerful fighting force. "Kitchener's Army" proved itself an inspired force on many a hard-fought field.

In June, 1916, the cruiser *Hampshire*, on which he had sailed for Russia, was wrecked off the Orkneys, and Earl Kitchener, with nearly all on board, was drowned. The vessel was sunk by a mine, probably one of a field of twenty-four laid by the German submarine U 75.

Kite. If you ever see, soaring high over the hills of Wales, a big brown bird with a long, deeply-forked tail, you will be looking at one of the rarest—some say it is the rarest—of all British breeding



RARELY-SEEN KITE

Although this is the "common" kite, it certainly does not merit the name in so far as Britain is concerned, for here this bird survives to breed only in one or two places.

Photo W. S. Berridge

KITE

When the Boer War broke out, in 1899, Kitchener was sent to South Africa, as lieutenant-general and chief of staff to Lord Roberts. Afterwards he became commander-in-chief of the British forces, a position he held until the victorious end of the struggle. It was largely owing to his efficient system of transport, wire barricades, and block-houses that the guerrilla warfare was finally ended. After the Boer War Kitchener served for seven years as commander-in-chief in India, later he made a tour of inspection of the forces of the Empire, and afterwards he was for three years British Resident in Egypt.

The outbreak of the World War found him in England in consultation with the War

birds, the kite. It now survives only in these mountain fastnesses, yet it was once the common scavenger of our streets.

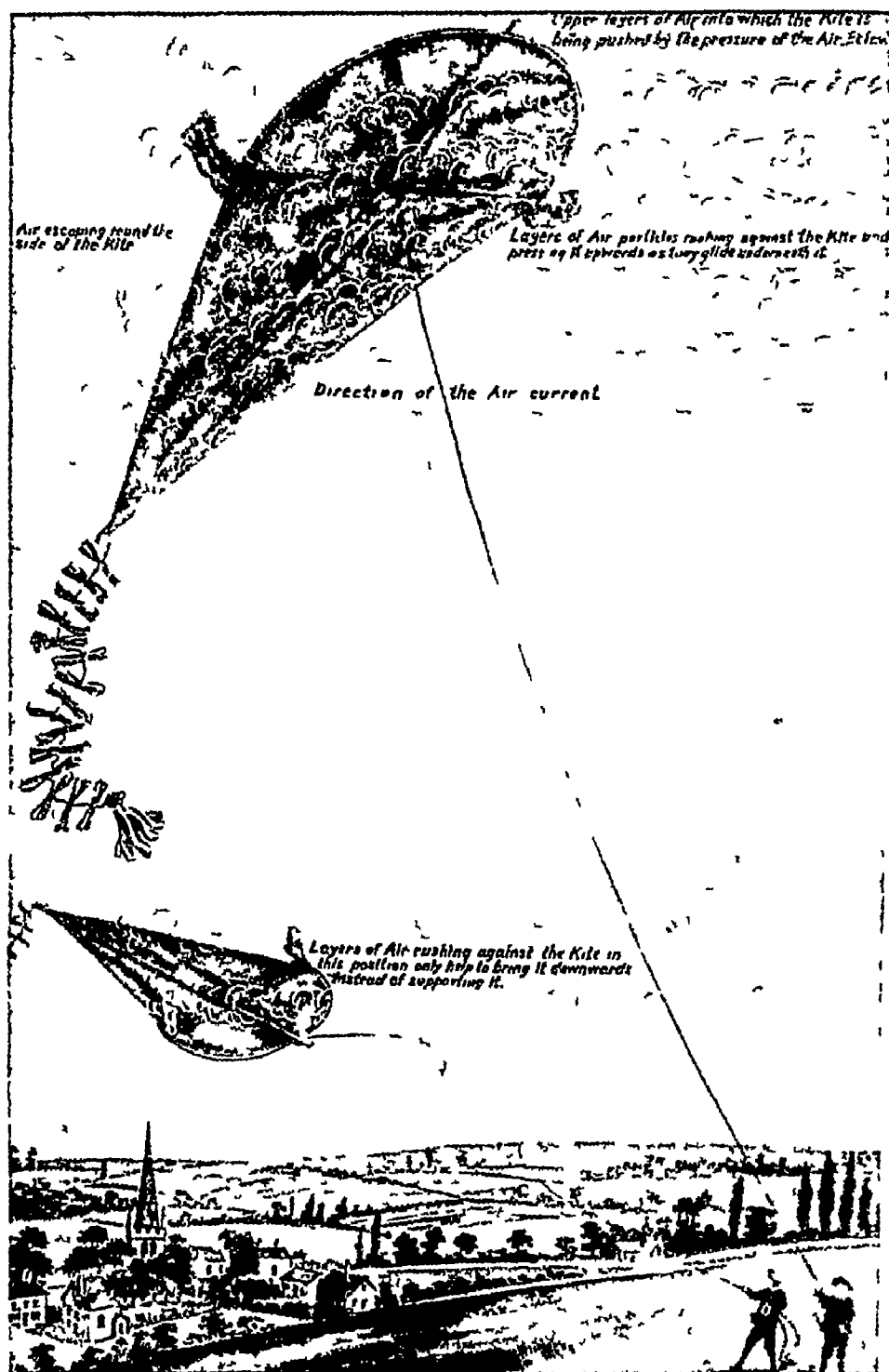
A member of the great group known as 'birds of prey,' the kite (*Milvus iclinus*) differs from most of its fellows in preferring dead to living food, and it lacks, therefore, the dash and courage of smaller birds such as the peregrine falcon, the hobby, and the merlin. In this respect it resembles carrion birds. Moreover, although a bird of prey, it was itself one of the principal quarries in the days of falconry, and much smaller birds were hawked at it. One of the attractions, in this case, was that the kite, which has indeed superb powers of flight, offered no easy victory to its pursuer. The kite is a well named bird, as a soaring bird it is the match of any in the country.

Besides the common European species, there are others in all parts of the world, especially in hot countries, where these birds perform their important function of scavenging, even in the most populous cities.

Kites. For years the daily weather forecasts were based upon reports from professional kite flyers at the Government weather bureaux, but the aeroplane and balloon have now replaced the kite. Great box kites

carrying instruments for recording conditions in the upper air were sent up from one to three miles high. To reach a height much over a mile several kites were used. A train of ten kites with $8\frac{1}{2}$ miles of wire has raised instruments to a height of more than four miles.

This was only one of many practical uses of the kite. Long before Benjamin Franklin with



HOW AND WHY A KITE FLIES SO STEADILY

The important thing in kite flying is that the string holds the kite against the air in a diagonal position. Then the rush of air against it acts like a wedge, tending to push the kite upwards and backwards. The string keeps the kite from going back, and so it rises.

HOW TO MAKE A PLAIN AND A BOX KITE

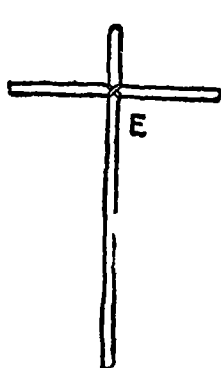


Fig 1

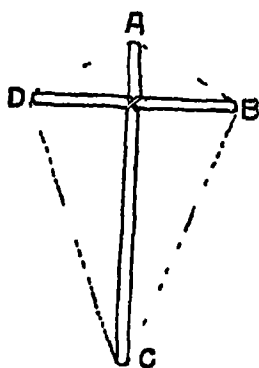


Fig 2

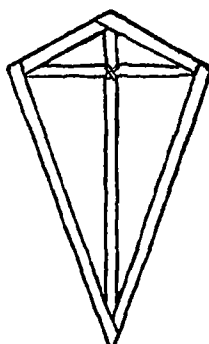


Fig 3

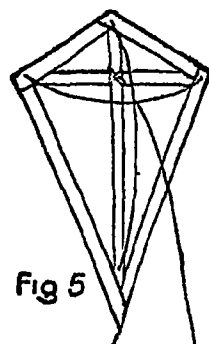
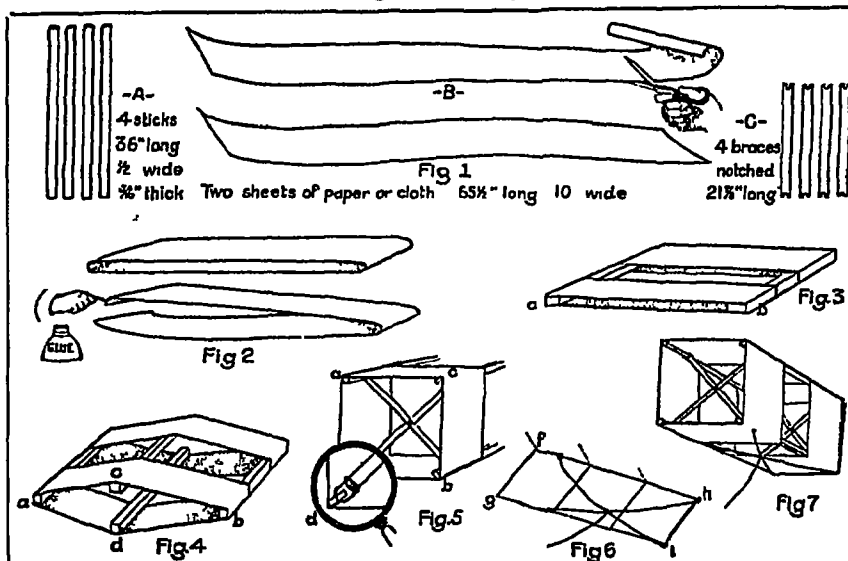


Fig 5

The simplest kite to make is the plain-surface kite over a two-stick frame, as shown in the diagram. Such kites may be from 1 foot to 30 inches high. The frame is made of two sticks of soft tough wood, a shorter crossing a longer vertical one above its centre (Fig 1). At the crossing point, E, the sticks should be fastened with small brads, or lashed with a light-weight string. A strong twine tied at point A is stretched round the frame, passing through notches or slits at B, C, D, and fastened again at point A (Fig 2). Cover the frame with light strong paper or cloth, pasting or sewing it over the string edges (Fig 3). This cover, which should be cut an inch larger than the frame, must not be stretched too tight. Next, fasten a slack string from X to Y and another from M to N (Fig 4). These form the kite bridle. At their crossing point the kite line should be fastened. Now your kite is ready for flight. If it dives and sways, it needs a tail made of twine with bits of paper or rags tied several inches apart (Fig 5). The length of the tail must be adjusted to the weight of the kite, and can only be determined after a long series of experiments.



To make a box kite, prepare four light smooth sticks of spruce or pine, each 36 in long, $\frac{1}{2}$ in wide, and $\frac{3}{8}$ in thick, these are the corner sticks of the frame (Fig 1, A). For the covers obtain two sheets of stout paper or cloth, $65\frac{1}{2}$ in long and 10 in wide, this allows $1\frac{1}{2}$ in for pasting (Fig 1, B). You will also need four notched cross-braces (Fig 1, C), each $21\frac{1}{2}$ in long, to hold the corner sticks in place when the covers are stretched round. When these materials are ready, paste or glue together the ends of each cover strip, overlapping $1\frac{1}{2}$ in (Fig 2). When dry, put into one of the cover bands thus formed two corner sticks at a and b, first gluing them on one edge. Allow these to become nearly dry, then repeat the process, and you have Fig 3. Now mark both cover bands at the exact centre between the sticks, and glue the remaining corner sticks (c and d) in place in the same manner (Fig 4). Allow the glue to dry thoroughly, then lift the sticks a and c, and sticks b and d will swing down and form a perfect square, as in Fig 5. You are now ready to spring the cross-braces into place. Bind string over the notches to prevent splitting (Fig 5, d). At the centre of each cover band fit the notches over the corner sticks (which should stand out diagonally), and spring the braces tight. Then tie them where they cross. Now fasten the slack bridle on the frame at h and i, and half-way from f and g on the first cover (Fig 6). Tie the kite line where the bridle strings cross, and your kite is ready to fly (Fig 7).

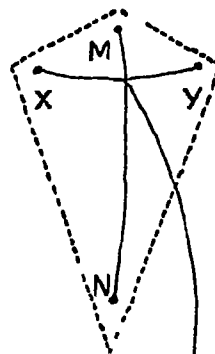


Fig 4



KITES

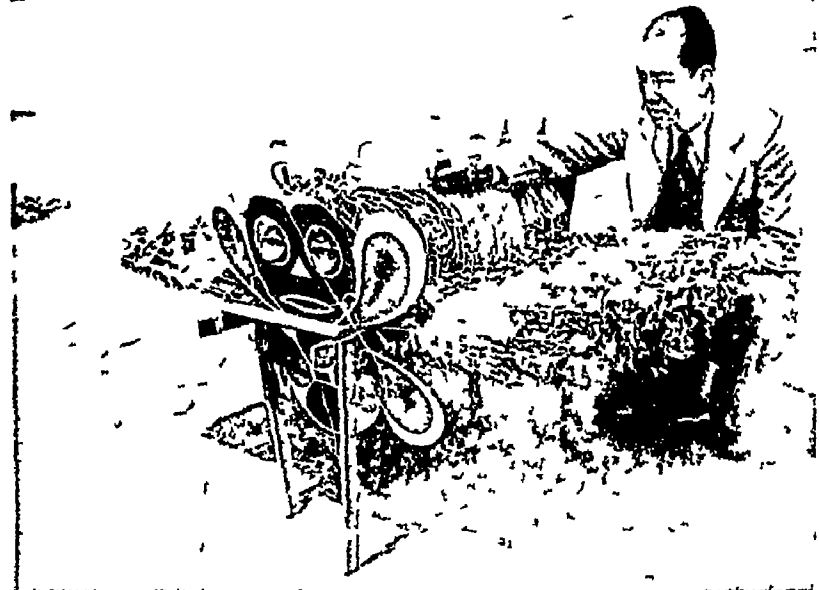
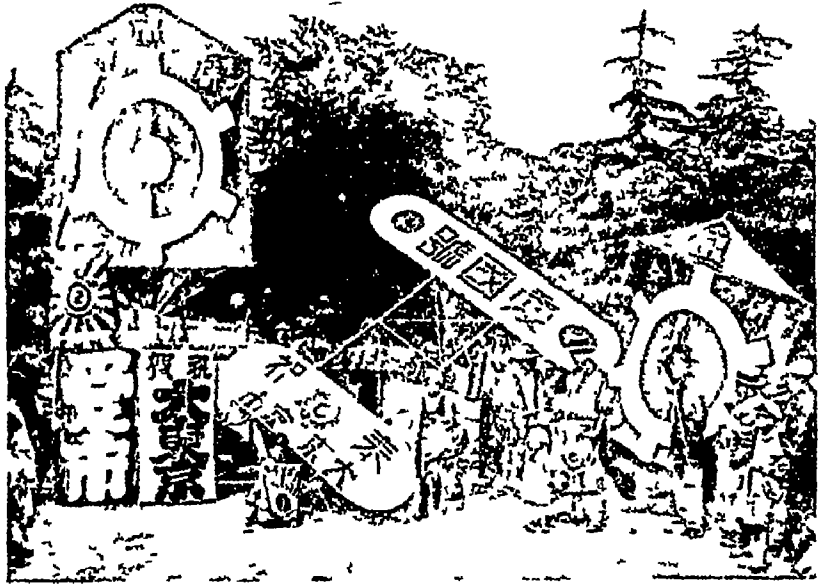
his famous kite and key drew electricity from a storm cloud, kites had been used for mechanical purposes. Ancient Korean and Chinese stories tell how kite strings carried cables over streams and chasms and so made passage for armies.

Even today kites are used in a similar way. Some of the greatest suspension bridges have begun from lines carried across a river by kites. Many a life, too, has been saved by kites which carried life lines to stranded ships. Kite photography is common, the camera being fastened to the frame and worked by a string. Men lifting military kites have been used to a certain extent for observation and signalling purposes.

In Eastern countries kite-flying is an ancient custom and popular pastime. What cricket and football are to England, kite-flying is to Korea, Japan, and China. Korean men, women, and children, from the highest in the land, fly kites during the first days of the new year, and in China "Kites' Day"—the ninth day of the ninth month—is a holiday.

In China and Japan this favourite toy is made to represent gorgeously coloured birds, insects or flowers, and is used in many highly decorated geometrical forms. In some parts of the East kite-fighting is a favourite sport. The strings near the point where the kite is attached are covered with glue and bits of glass, so that a player who has manoeuvred his kite to windward of his opponent's can cut the cord of the other kite with a sudden jerk.

Kites are of two general classes, the plain surface and the box kite. Each has many varieties, and there are also combination kites using both the plain and box construction. Compound kites may have their several members on one string, or on individual lines connected to the main line. Tailless kites are the most popular, though a large, flat-surfaced kite requires a balance that may be best given by a tail. The box kite is a square frame made of



FLYING KITES IN THE FAR EAST

The upper photograph shows a scene in Tokyo with kites of many sizes and forms about to take the air. Beneath is one of the greatest living Chinese experts in kite-flying preparing a Dragon kite, composed of hundreds of parts, which when it takes the air expands to a length of 240 feet and is capable of lifting a man.

Photos Keystone Wide World Photos

four sticks, one at each corner, and four braces, two near each end of the kite, placed diagonally across the inside from one corner stick to the other. The covering is either of paper or cloth.

The flying of a kite depends upon the same principle as the sailing of a boat or the soaring of a bird or an aeroplane.

The principle is this. The current of air, moving horizontally, strikes the face of the kite, tending to drive it backward. The *inclined surface* of the kite converts part of this force into a thrust upward and, in addition to this thrust, the rush of the wind round the sides of the kite creates a partial vacuum on the upper side. Hence the kite steadily rises.



Knighthood. A knight in armour would present a very strange appearance on a modern battlefield. His prancing steed and coat of mail, the heavy iron helmet which covered his head, the shield which he carried on his left arm, his lance and shining sword—all these belong to bygone days and have little place amid the storms of shot and high explosive shell and the labyrinths of sunken trenches and barbed-wire entanglements of modern warfare.

Knighthood flourished before the time of guns and gunpowder, when battles were won by hand-to-hand conflicts of heavy-armoured knights. Fighting and alarms were almost an everyday occurrence, and the common people generally could not protect themselves against an invading foe. In times of danger they fled to the castles or strongholds owned by the nobles. To obtain protection the poorer folk became the serfs or villeins of their powerful neighbours, and those in turn were the vassals of others still more powerful, and closely connected with this feudal system, as it was called, we find the institution of knighthood.

The education of a knight began at the age of seven, when he was taken from his home and sent to the castle of some famous nobleman, perhaps his father's lord. Here, until he was 14, he served the lord and lady as a page. It was his duty—and he esteemed it a privilege—to accompany them at all times. He waited on them at table and went with them to the chase. He received religious instruction from the chaplain, training in arms from the squires and was

taught by his mistress and her ladies to honour and protect all women. He also learned to sing and to play the lute, to hunt and to hawk. But, above all else, he learned to ride a horse.

At the age of 14 he became a squire. He now learned to handle sword and lance, and to bear the weight of the heavy armour. In addition to other duties, he had now to carve at table and to accompany his knight to war. He saw to it that the knightly sword and other arms were polished until they shone. He stood by to give aid in conflict should his lord be overmatched, to lend his horse should the master lose his own, to bear his body away when wounded or killed in battle.

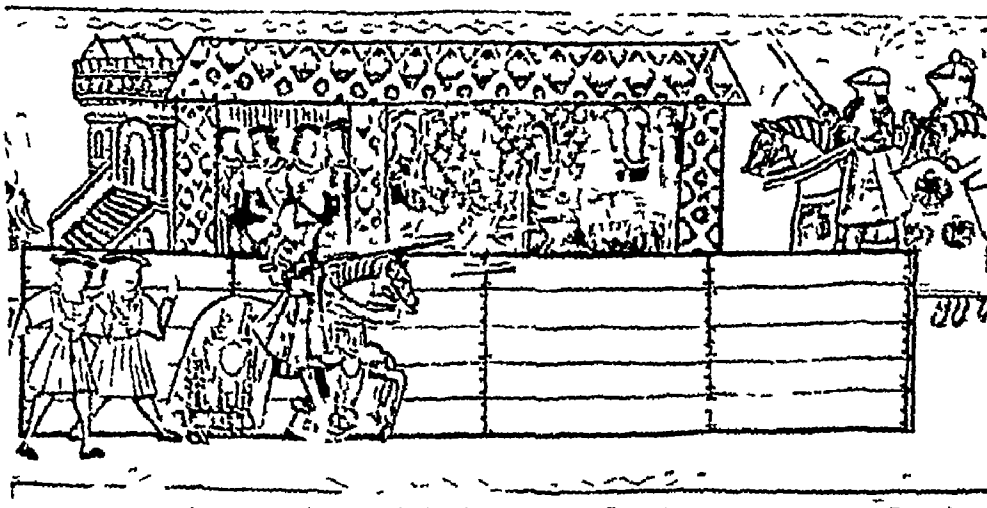
At the age of 21, that is, if a page and squire he had acquitted himself well, the young man was made a knight. This was an occasion of elaborate ceremony and solemn vows. After the bath of purification the candidate for knighthood knelt or stood all night in prayer before the altar on which lay the precious sword which he would don on the morrow.

In the morning there was a religious ceremony, with, perhaps, a sermon on knightly duty to protect the weak, to right wrongs and to honour women. Then, in the courtyard, in the presence of the assembled knights and fair ladies, a knight's armour was buckled on the candidate, piece by piece, a sword was girded about his waist, and spurs were attached to his feet. He then knelt to receive the accolade. This was a light blow upon neck or shoulder, given by the officiating lord or knight with his

KNIGHTS TILTING IN THE TOURNAMENT



The tournament assuaged in times of peace the knightly appetite for battle. It originally included fights on foot as well as jousts, and was often serious enough until the introduction in the mid-15th century of the "tilt" or longitudinal barrier seen in this miniature precluded direct collisions. In this picture the knight on this side of the barrier has unhorsed his opponent with his lance.



The noble traditions of chivalry that were born in the hard days of the Crusades expired amid the superficial splendours of the jousting field in the fifteenth and sixteenth centuries and for use in these knightly tourneys plate armour assumed its most umptuous and least practical forms. This illumination shows King Henry VIII tilting in the jousts held at Westminster in honour of the birth of a son to Catherine of Aragon who looks on from a canopied couch.

in 1533 M. v. C. 116x M. 155. a. d. 1533. Co. v. of Ar. Westminster Hall.



A YOUNG KNIGHT'S VIGIL

THOUGH a young knight might win his spurs on the field of battle for bravery in the face of the enemy, in the early days of chivalry at least he had to be good as well as valiant. There was a religious element in the initiation of the early knights, and among the formal services of the Church was one for the making of a knight. The religious ceremony began with an all night vigil of the aspirant before the altar on which his arms were laid. He then took a ceremonial purification in a bath—from which practice arose the still existing order of Knights of the Bath. This prepared him for the Mass after which there was a sermon.

Knighthood was a military guild, and there was a freemasonry among knights of all nations that did much to humanize a rough age. In 1165 John of Salisbury thus described the ideals of knighthood: "To protect the Church, to fight against treachery, to reverence the priesthood, to fend off injustice from the poor, to make peace in your own province, to shed your blood for your brethren, and if need be to lay down your life."

This picture by John Pottier, R.A., showing a novice with drawn sword keeping his vigil is in the Tate Gallery, London.

KNIGHTHOOD

list, or, more usually, with the flat of a sword. As he gave it he said, "In the name of God and St Michael and St George, I dub thee knight, be brave and loyal." This ceremony was followed by exhibitions of the newly-made knight's skill in arms.

Sometimes on the occasion of a knighting the lord at whose castle the ceremony took place gave a tournament. This was often a very gorgeous and extravagant entertainment. Knights for miles around were invited to come and take part, while many persons of distinction came to witness the events. Sometimes the visitors came in such numbers that the lodgings of the castle were filled, and tents were put up for the later arrivals. The shield with its coat of arms served as a sort of residential name plate to the passers by.

In the morning, after attending mass, the knights would go to the tourney field or lists. Here the combats or jousts between the knights were fought. Sometimes two knights fought a duel, sometimes whole companies met in combat. When all were assembled, the heralds announced the names of the contestants.

Along the sides of the field were handsome pavilions filled with beautiful ladies, gay young pages, and jewel bedecked nobles. The knights were resplendent in shining armour with swords like silver, while their golden spurs glittered in the sunlight. Banners fluttered everywhere, and here and there gleamed rich cloth of gold.

The combats which took place in this gay setting were not gentle. The points of the weapons, to be sure, were usually encased in blocks of wood to make the encounter less harmful, but the sport was so rough and the knights jousted in such earnest that many were wounded, and not a few, occasionally, killed. About each knight's helmet was tied the favour his lady had given him, and he fought to do her honour

quite as much as to do himself credit. The joust was attended by much excitement, with the blowing of trumpets, the clash of steel the shouts of heralds, and the applause of the spectators, and it continued until one or other of the knights was overcome. The defeated knight yielded his horse and armour to his adversary, and was assisted from the field by the squire.

Sometimes a tournament lasted for several days, with feasting, dancing, and hawking filling the hours not given to fighting. Hawking was a sport indulged in by the ladies and the squires as well as by the knights, and almost every lady had her own hawk or falcon, which, when unhooded, was trained to rise into the air and attack game birds. (See Falconry)

Often during the festivities of a tournament a large pie was baked and live birds concealed inside. Then in the great hall the pie was opened, the birds flew about, and the falcons were loosed at them. This has been immortalized in the nursery rhyme—

Sing a song of sixpence, a pocket full of rye
Four and twenty blackbirds baked in a pie
When the pie was opened the birds began to sing,
Wasn't that a dainty dish to set before a king?

After the festivities attending the conferring of knighthood, the young knight was free to go forth with his squire, in quest of adventure.

As a knight-errant he sought a fair maiden in need of a champion, or a strange knight with



TRYING ON THE ARMOUR OF THE KNIGHT

What a proud moment it must have been for the family of a young squire when the time came for him to put on the honoured armour of a knight! This picture shows a 'try on,' with the armorer fitting the metal 'garments' with the aid of hammer and pincers. In a few days the squire will be 'knighted' with elaborate ceremonies.

whom to joust Sometimes he stationed himself at a bridge or cross-road to challenge to combat any knight who happened to pass that way Usually he was sure of hospitality at any castle to which he came

After a time he might return to his father's castle, or join the following of some great lord, or become one of the multitude of Crusaders who journeyed to rescue the Holy Sepulchre Whenever or however he went, he took with him the three watchwords of a knight Religion, Honour, Courtesy

The story of King Arthur and his Knights of the Round Table makes thrilling reading, while Sir Walter Scott's "Ivanhoe" conveys all the atmosphere of the days of knightly chivalry

However, with the rise of the longbow and the crossbow carrying wounds or death from a distance, and the invention of gunpowder and cannon rendering useless the feudal castle, the knight in armour passed out of existence

The oldest order of knighthood in the United Kingdom is that of Knight Bachelor, a title of honour conferred for valuable service rendered to the King or State, carrying with it the title "Sir" There are also nine honorary orders of knighthood—the Garter, the Thistle, St Patrick, the Bath, Star of India, St Michael and St George, Indian Empire, Royal Victorian Order, and the British Empire (See also Orders and Decorations)

Knights Templars.

This famous order of chivalry originated during the Crusades, when Hugh de Payens and Godfrey de St Omer and seven other knights established it in 1118, ostensibly to protect pilgrims on the roads in the Holy Land The name is derived from the fact that their first house was close to the site of the Temple in Jerusalem

Their power speedily extended, and, having declared themselves defenders of the Christian faith and the Holy Sepulchre, they received recruits from all over Europe Soon the strength and influence of the Templars rivalled that of the Knights of St John of Jerusalem, or the Hospitallers, a contemporary order

The Saracens drove the Knights Templars out of the Holy Land in 1291, but by this time the order was immensely wealthy, its members considering themselves above kingly authority It was envy of this wealth which caused their fall

Philip IV of France and Pope Clement V set on foot inquisitions and massacres of the knights, on the alleged grounds that they worshipped the devil and practised sorcery This persecution extended throughout Europe, until in 1314 their Grand Master of France was burned alive in Paris, and the possessions of the knights and the order were confiscated almost everywhere, except in Germany In England the order was suppressed without violence The Templars were placed under arrest during the reign of Edward II, and in 1309, after they had been convicted by a council of committing various crimes, the whole of their possessions passed into other hands

The Temple Church, close to Fleet Street, London, and the peaceful and picturesque locality around it known as "The Temple," are romantic links with the far-off days when the order of Knights Templars, as we have seen, flourished in the 12th and 13th centuries, and was suppressed to the accompaniment of abominable cruelties in the 14th

The first home of the Knights Templars in London was in Holborn, where Southampton Buildings now stand, but they afterwards acquired a better site near the river, where they built their round church, which still stands in a good state of preservation, and where several of the tombs of the knights and Crusaders may still be seen (See the illustration on this page)

Knitting Machines.

During the World War women and girls everywhere were fashioning knitted socks, scarves, and sweaters of khaki or grey yarn for the soldiers It was fascinating to watch their deft fingers thrusting needles of steel or bone through loops of yarn, catching the yarn and forming new loops, and transferring the rows from one needle to the other until the whole fabric was completed This art is very modern compared with weaving, for no allusion to knitting is found until later than the year 1400

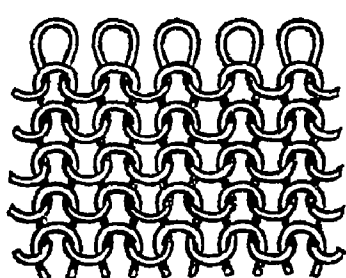
The Rev William Lee of Nottinghamshire, who lived about 200 years later, watched knitting needles being used in this fashion, building up a garment very slowly for all their flashing speed He believed he could make a machine which would do this work much more quickly Instead of two or three single needles, his machine had as many needles as there were



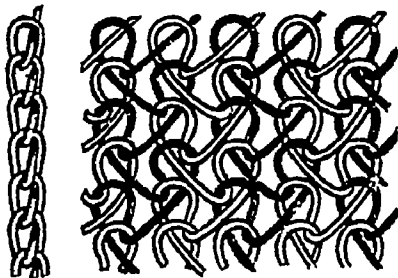
KNIGHT TEMPLAR

Above is the effigy in the Temple Church, London, of William Marshall the Younger, Earl of Pembroke, a Knight Templar of the Middle Ages

THE CLEVER MACHINES THAT KNOW HOW TO KNIT



How the Loop is formed in Plain Knitting



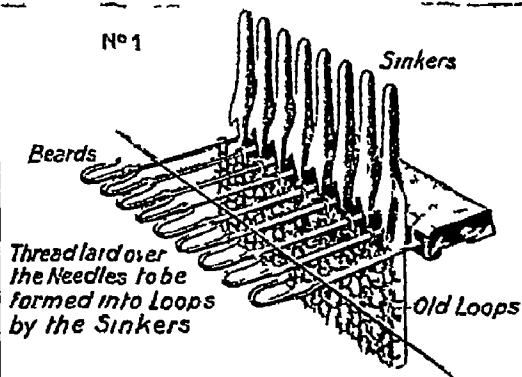
Formation of Loop in Warp Knitting



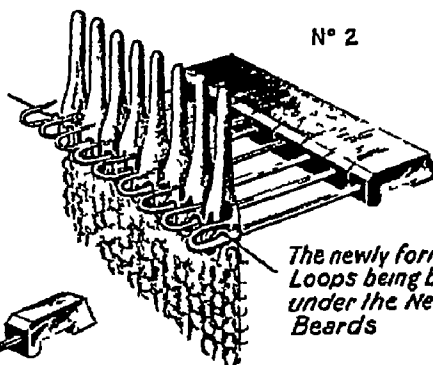
Bearded Needle set in Lead



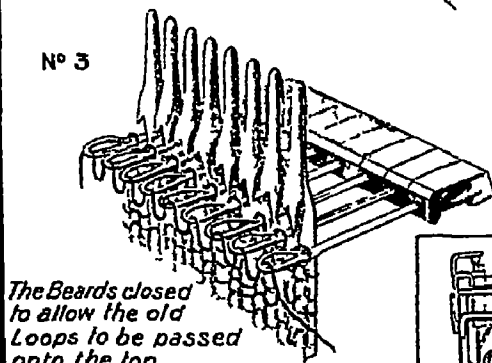
Latch Needle used in individual action



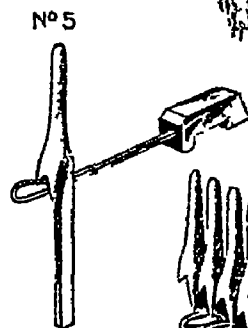
Thread laid over the Needles to be formed into Loops by the Sinks



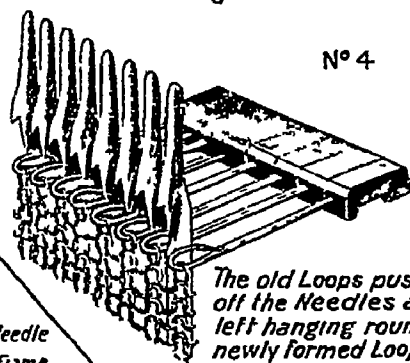
The newly formed Loops being brought under the Needle Beards



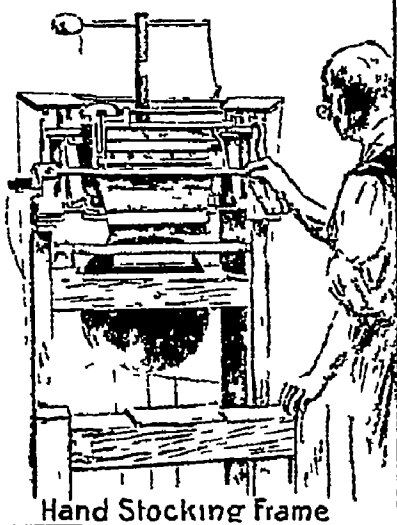
The Beards closed to allow the old Loops to be passed onto the top



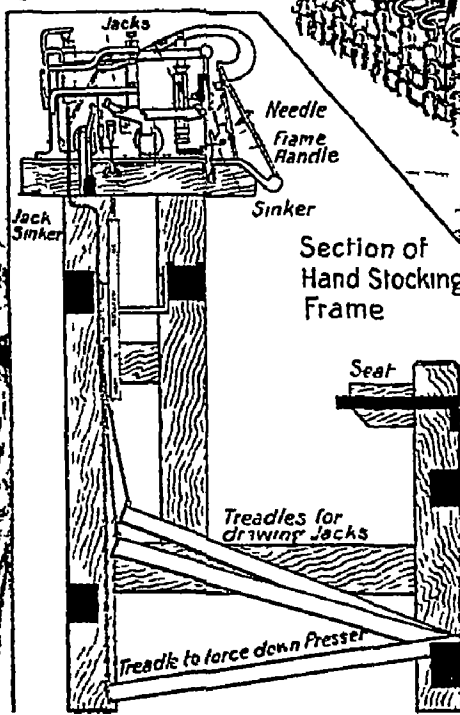
Sinker closing Beard of Needle



The old Loops pushed off the Needles and left hanging round the newly formed Loops



Hand Stocking Frame



Section of Hand Stocking Frame



Part of a large Power-driven Knitting Machine

The top pictures show different styles of knitting and two kinds of needles used in the work. The four middle pictures show 'framework knitting' with one continuous thread. 1 The thread lies across the needles ready for the next row. 2 The sinks come forward and dip to loop the thread, at the same time closing the beards of the needles as shown (5) in the centre. 3 The sinks rise again and push the old loops off the needles. 4 The row is completed. The pictures at the bottom show the old hand frames and the newer types of power-driven machines.

loops, so arranged that they formed and gave off the loops alternately

The inventor made a pair of stockings for Queen Elizabeth, but she was disappointed because they were of coarse worsted and not silk. So Lee made another machine which had 20 needles to the inch instead of eight, and with this he knitted a pair of silk stockings for the queen. But she did not give the inventor a patent or any assistance, and he took his machine to France.

But the use of Lee's invention spread in England, and from it has come the wonderful and complicated machinery of today.

The old machines knitted then webs flat, and stockings required to be sewed up at the back. In 1828 the first steam frame was introduced for making stockings. It is now used more than any other because of its greater speed and capacity. Set close around the circular frames are hundreds of little needles which seem to rise one after another, apparently of their own accord. They catch the yarn, and pull it down through another loop which is just slipping off their peculiarly shaped heads. The head of this needle, after the first loop is safely off, opens and holds the new loop until the next one comes down through it.

Machine-knitted fabrics are of two kinds known as "framework knit" and "warp knit." In the first, one continuous thread is looped over and over again, the loops supporting themselves, just as in hand-knitting. Warp knitting is made by inter-looping parallel threads, as many threads being used as there are loops in the width of the fabric. The former is used in making hose, underwear, sweaters, etc. The latter, because it gives greater scope for reproducing designs and colour, is used in shawl and glove-making, etc.

It is not difficult to distinguish between the two. If a thread of framework knitting is broken the whole fabric can be unravelled by pulling it. If, instead, a broken thread unravels a line straight down its length, the material is warp knit.

The modern knitting machines are power-driven and entirely automatic. The needles, which slide in grooves, and are raised and lowered by little V-shaped cams which move round the machine beneath them, are dropped or added as the material is to be narrowed or widened. Fancy ribbed effects in the tops of sports hose, etc., are made with a Jacquard

attachment. Some of these machines are capable of making 600,000 loops a minute.

Knitted goods differ from woven goods in that the latter are made up of two complete sets of threads, intersecting at right angles, while a knitted fabric is made by looping one continuous thread or interlooping a series of parallel threads.

Knives and Forks. In Queen Elizabeth's time etiquette ruled that one should not use more than three fingers when conveying food to one's mouth. Even 300 years ago forks were great curiosities in England and most other countries. Table-knives, too, were rare, and large portions of food were cut up with the knife which each person carried with him in his stocking or his belt.

But though table-knives are comparatively recent, knives for general purposes were one of the first inventions of early Man. Many implements, whose use and general form was that of a knife blade, have been found dating back to the Stone Age, made of flint and showing a series from the most primitive to the finest workmanship. Spoons, too, have been in use a long time. In museums we often see spoons of wood, stone, or ivory which were found in ancient Egyptian tombs.

The Greeks and Romans used spoons of bronze or silver and, during the Middle Ages, spoons of bone, wood, or tin were common, the wealthy had spoons made of beaten silver. Forks came along after knives and spoons, and were long used only in cooking or for holding the joint of meat while it was being carved. The first forks were two-pronged affairs, much like our carving forks, and were made of iron, bone, or even hard wood.

The use of the fork at table seems to have been introduced into Europe from the Orient through Venice. A story of the 11th century tells of the wife of a Venetian ruler who was "luxurious beyond belief" because, "instead of eating like other people, she had her food cut up and ate the pieces by means of a two-pronged fork."

When the custom of using a dining-fork was brought to England in 1608 by a traveller who had observed it in Italy, it caused a great deal of excitement. He was laughed at by some, and railed at by others, one person declaring that it was an "insult to Providence, who has given us fingers." Even today forks are not used in many parts of the world. The Persians and the Egyptians, for example, think the European method of eating very queer.



ANCIENT CUTLERY

Here are a pair of beautifully chased carvers, and one "dinner" knife, made in Italy in the 16th century, when forks at least were still uncommon.

National Museum Florence
photo Alinari

ALL the KNOTS & HOW to TIE THEM

Not only Boy Scouts need to know how to tie knots, for all of us at some time or other are faced with "knotty" problems requiring ability to make a reef or slip knot, or a splice

Knots, HITCHES, AND SPLICES It is very important to know how to tie knots properly. Such knowledge saves much time and trouble, and in some cases even lives depend upon it. The sailor aloft in a ship's rigging, the cowboy roping a wild steer, the steeple-jack dangling high in the air, all of them know what will happen if a knot slips.

Some knots are valuable because of the speed with which they can be made. But the best knots are those that hold firmly without slipping, yet do not bind so tightly that it is hard to untie them when their work is done. Most

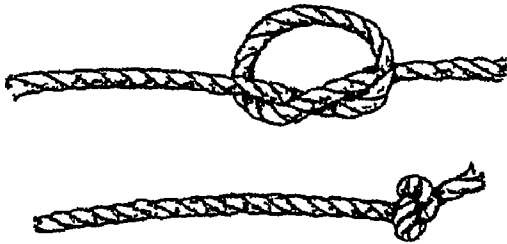


Fig 1 —Overhand Knot

Standing part of the rope is held in the left hand and the end is passed back over it, and put through the loop just formed.

of the simpler knots which are described below meet this requirement.

When a rope is bent in a loop, the looped part is called the bight. The long portion of the rope is known as the standing part, and the short part used in forming the knot or hitch is known as the end. The simplest knot that is made is the overhand knot (Fig 1). It forms a part of many other knots. It is used to keep the end of a rope from ravelling, to provide a hand hold on a halter or bell rope, to prevent the end of a rope from running through a pulley, or a sewing thread from pulling through cloth. The square knot, known to generations of boys as the reef or sailor's knot (Fig 2A), is the commonest of all knots for fastening ropes or strings together. When correctly made, it is as perfect as a knot can be, for it is reliable, and unties easily. If we tie our shoe-laces correctly, we use this square knot, although the ends are not pulled right through but are looped and drawn tight. When a reef knot is tied without a single or double bow, we call it a "hard" knot. Its one disadvantage is that it will not hold so well when made with ropes of different sizes. This knot is always used when the sailor reefs the sails, for even with stiff wet ropes it can be loosened easily by pushing the free ends back against the knot, and completely untied

by pulling at the loops which appear. Surgeons use the reef knot when ligaturing arteries.

Sometimes when we are tying our shoe-laces we make a mistake, and instead of making a reef knot we get the troublesome granny or lubber's knot, which slips easily and gives way

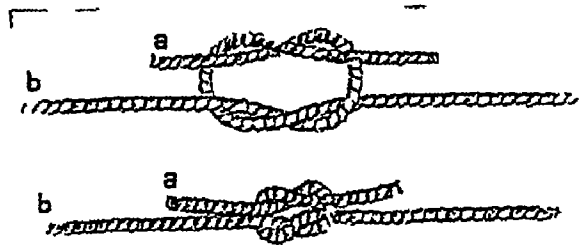


Fig 2A —Square Knot

The illustration shows the proper way to tie two pieces of rope together. The ropes are passed once around each other. The ends are then brought up and the process repeated, care being taken that on each side the standing part and free end (a, b) come out on the same side of the loop. When drawn tight, the free ends will lie parallel to the standing parts.



Fig 2B —Granny Knot

This unreliable knot results when the second twist, instead of following the square knot rule, is made in the reverse direction so that the parts (a, b) are separated from each other by a part of the loop. When this is drawn tight the ends stick out at right angles to the knot.

under a strain (Fig 2B). Many people go through life with their shoe laces always dangling without realizing that they are giving themselves much useless trouble by not learning the difference between these two knots. The weaver's knot is another knot for tying ends of rope together (Fig 3). Weavers use it to tie

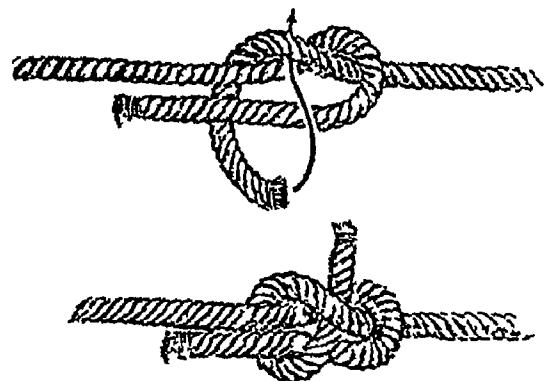


Fig 3 —Weaver's Knot

This also begins like a square knot, but one of the ends thrusts back under itself and comes out at right angles to the knot.

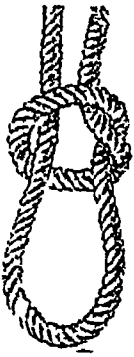


Fig 4 —Running or Slip Knot

A bight is first formed and an overhand knot made around the standing part

together ends of threads, as it passes smoothly through the needle One of the simplest "eye" knots is shown in Fig 4, and is known as the running or slip knot

The bowline is one of the best and most useful of all the knots, indeed, it is often called the king of knots (Fig 5) It will not slip and is widely used—on the farm, in construction work, by mechanics, and in nearly every branch of

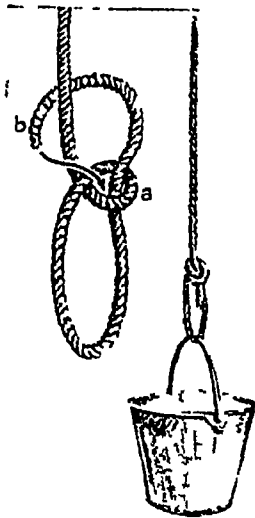


Fig 5 —Bowline

Make a loop (a) and pass end (b) through it. Now carry end as indicated around the rope above the loop and then back through the loop again, and draw it tight When tying an animal or fastening a rope to a bucket, the end (b) is first passed round the animal's neck or round the bail of the bucket, before going through the loop (a)

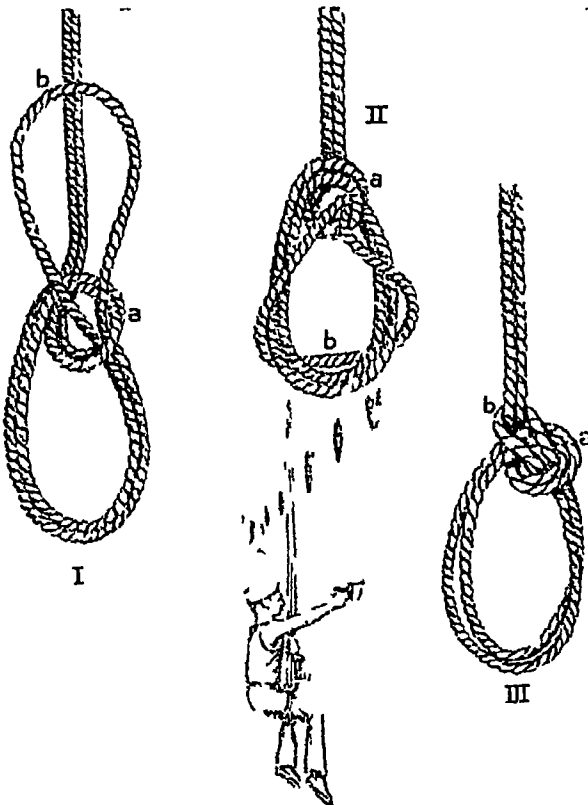


Fig 6 —Bowline on a Bight

Make a loop (a) and pass the end of the bight (b) through it as in Part I Now hold the loop in the left hand and pull the bight down and around the hanging part as in Part II Now raise the bight (b) up above the loop (a) and draw it down tight as in Part III

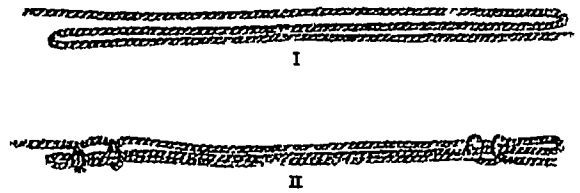


Fig 7 —Sheepshank

Fold rope back on itself forming a double loop of the required length (I) Then weave a clove hitch (Fig 11) with the standing part of the rope over each end of the double loop (II), and draw tight.

industry It is the safest knot to put round an animal's neck It is often used in fastening a rope to a bucket to hoist material, such as tools or mortar, to workmen on a scaffold A close relative of this knot is called a "bowline on a bight" (Fig 6) Being made with a loop or bight of the rope, it is much stronger and does not require the use of either end of the rope in tying it With this knot a man can be lowered in safety from a great height Sailors swing comfortably in the loop of this knot It is used also to hold ships to their mooring posts

Although there is no sharp distinction between knots and hitches, the name "hitch" is usually applied to those temporary devices which are not, as the sailors say, "made fast" A knot is thus the more permanent fastening Another difference is that a knot may be made in the rope itself without requiring anything else for its security A hitch, on the other hand, usually takes the form of self-binding loops round some solid object, and will come loose as soon as the strain is removed The sheepshank is the most practical and satisfactory way of shortening a rope without cutting it, and this hitch often proves of use to sailors (Fig 7)

The halter-hitch has many uses, the most common one being to fasten the halter ropes

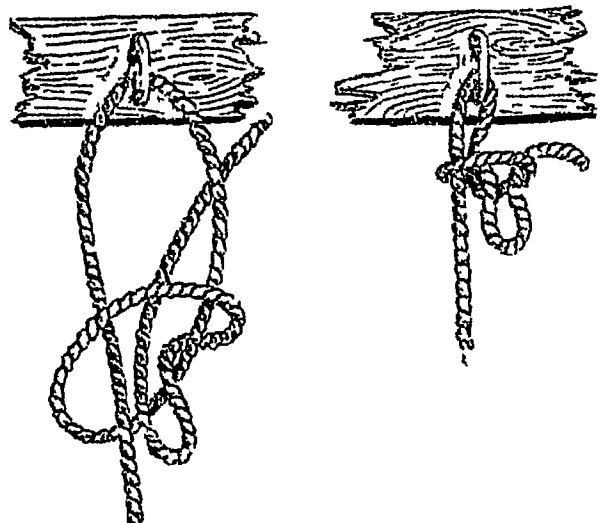


Fig 8 —Slip Knot Halter Tie

Put end of halter rope through ring or hole in manger, then tie a slip knot as in Fig 4, except that the end of the rope is not pulled all the way through, but is left to form a loop

KNOTS

of horses or cows to the manger or to a post or hitching ring (Fig 8) When a halter-hitch is properly made, it will slip tight, and therefore should never be used round an animal's neck. An even better halter tie is shown in Fig 9

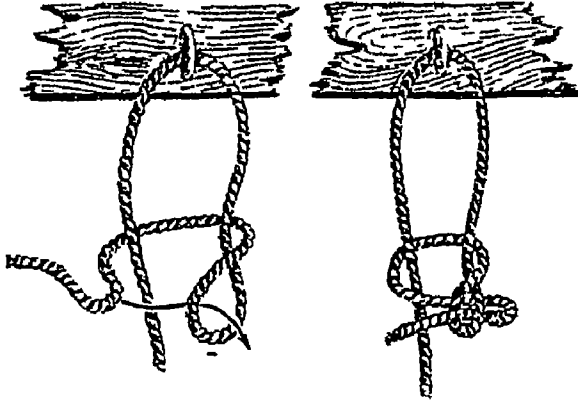


Fig 9 —“Figure Eight” Halter Tie

The difference between this knot and plain halter tie lies in the extra twist given the first loop, before the second loop passes through it.

This is called the “figure eight” tie, and no matter how tight it has been drawn by the animal, it can easily be untied by jerking the loose end of the rope.

The clove hitch, the best known of all the hitches, is easy to make, and the harder the pull against it the tighter it holds. The foundation

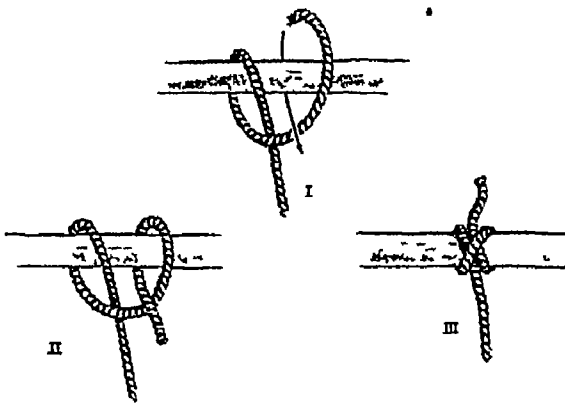


Fig 10 —Clove Hitch

To put the clove hitch on a stake or other support, the top of which can be reached, make a half-hitch or loop (I), passing the right hand part of the rope under the left. Now hold the first loop in the left and make another one exactly like it with the right (II). Now slip the right hand loop over the left hand loop, and drop the two loops over the stake drawing them tight. When the clove hitch is put around a tree or high pole, the end has to be passed round and woven under and over to get the same effect.

of it is the half-hitch (Fig 10, I). It is, in fact, sometimes called the “double half-hitch.” It will serve as well as a fastening whenever the rope is to have a constant and steady strain upon it. It is always easy to loosen, even when made with a hard wet rope. In Fig 11 the clove-hitch is used to make a running noose

Few people know how to splice a rope, yet a knowledge of splicing is valuable in many ways. A worn or broken rope can be neatly mended by this means, and a good splice is always stronger than a knot. Splicing is necessary if the rope is to pass through pulley blocks where knots cannot be used.

The simplest type of splice is the short splice. In making this the strands of each rope are spliced into the strands of the other rope. First the strands of each rope are untwisted (Fig 12). Then the ends are brought together so that strands *a, b, and c* alternate between strands *d, e, and f*. When they have been pushed together as far as they will go (II) they may be tied with a string to hold them in place during the remainder of the operation.

Taking one of the strands (*a, III*), it is passed over the twisted strand nearest to it and under the next to it. The same thing is done with strands *b* and *c* in one direction, and with *d, e, f* in the other direction. The process is repeated (IV) until all the six

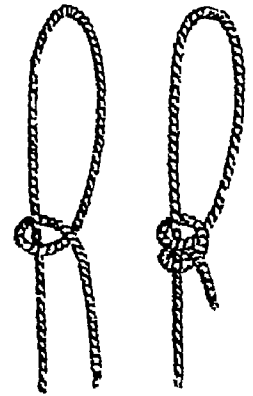


Fig 11 —The Clove Hitch Slip Knot

In this knot the rope is looped over and a clove hitch is made around the standing part.

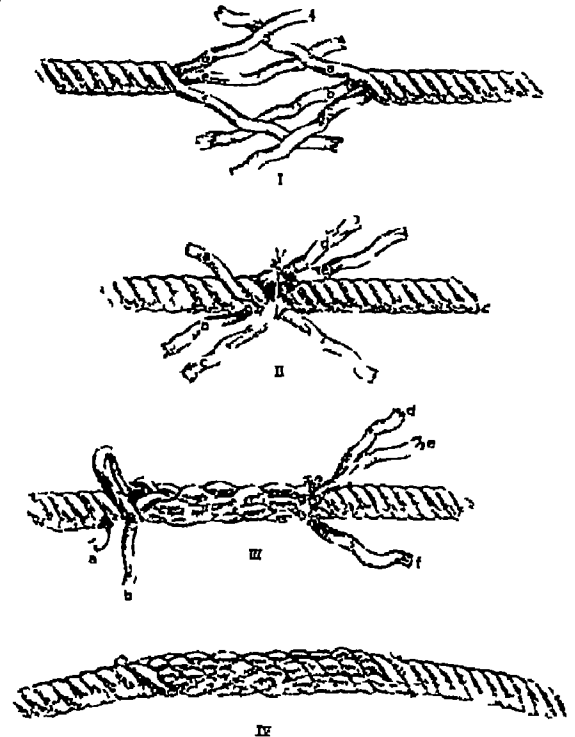


Fig 12 —The Short Splice

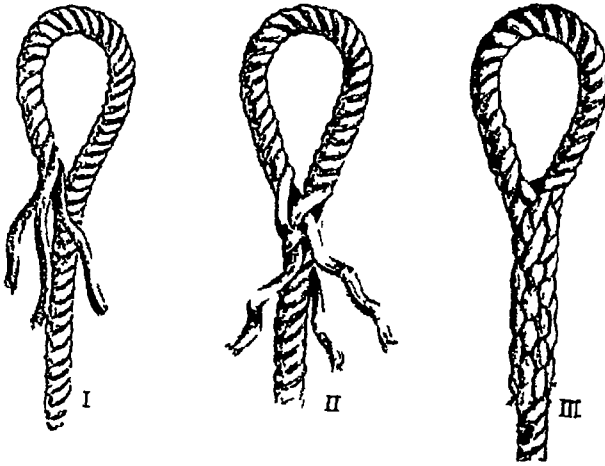


Fig 13 —The Eye Splice

loose strands have been woven over and under into the solid body of the rope. Care must be taken that the separate strands do not unravel during the splicing. A properly-made splice will give practically the same strength as the original rope, provided that a sufficient length of strands is spliced. The short splice, of course, makes the joint double the thickness of the rest of the rope. In splicing hard-twisted ropes, a pointed peg or marlin-spike is often used for making the openings under the twisted strands so that the loose strands can pass through more easily.

The eye splice is made according to the same principle as the short splice, except that the end of the rope is woven back into itself, forming a loop, which in this instance is called an "eye" (Fig 13). The rope is untwisted for six or eight inches, and the untwisted ends are doubled back against the main part of the rope to form a loop of the size desired (I). Each of the loose ends is then passed over the nearest strand and under the next (II) until the splice is completed (III). It will be noticed that here, as in the short splice, the loose ends are woven round in the reverse direction from the twist of the body of the rope. Another common splice is the so-called 'long splice,' used when the rope must pass through a block, the joint being the same thickness as the original rope.

Knox, JOHN (1514 ?-1572) How true is Thomas Carlyle's appreciation of Knox, wherein he says "His works have not died. The letter of his work dies, as of all men's, but the spirit of it never." Seldom, indeed, has a man so unprinted himself upon a nation as did the religious reformer John Knox upon the people of Scotland.

Nowhere was the Church of his day more corrupt and oppressive than in Scotland. The powerful Cardinal Beaton, Chancellor of Scotland, matched the scandal of his private life with the zeal with which he persecuted heretics. His murder, in May, 1546, is attributed to revenge for his burning of the reforming preacher, George Wishart. Seizing the cardinal's castle of St Andrews, his murderers stood siege there, and among the strangely assorted company of sympathizers who flocked to their aid was John Knox. Here he received a literal "call" to his life work from the assembled company of reformers.

In June, 1547, the castle surrendered to a French fleet, for Scotland was then bound in



JOHN KNOX PREACHES TO THE PROTESTANT LEADERS

The great Scottish reformer returned to Edinburgh from exile in 1559, and, though at first outlawed, raised such an outcry throughout Scotland that he was allowed to preach publicly for six months. Then took place the scene depicted by Sir David Wilkie above, when Knox whipped up the enthusiasm of the Lords of the Congregation with his powerful oratory.

Tate Gallery London photo Mansell

close alliance with France Knox and other captives were carried to France and condemned to labour at the oar in the convict galleys Released in 1549, he took refuge in England, but with the accession in 1553 of Mary Tudor, England ceased to be safe for Protestants The next five years he spent chiefly in Geneva in contact with Calvin, the French reformer

The French regent of Scotland, Mary of Guise, believed herself strong enough in 1559 to forbid the reformed preaching When Knox arrived in Edinburgh, in May of that year, he was outlawed He escaped to Dundee and Perth, where his sermons against "idolatry" led to civil war

To counterbalance the French alliance, on which the regent relied, the Lords of the Congregation, as the Protestant chiefs were called, successfully appealed to England, where Elizabeth now reigned in place of Catholic Mary Mary of Guise died almost at the moment of Protestant victory A treaty signed June 6, 1560, withdrew the French troops and left the Lords of the Congregation the masters of Scotland

Knox's power was now come to flood tide When young Mary, Queen of Scots returned to Scotland in 1561, only the drawn sword of her half-brother, Lord James Stuart, secured her the privileges of the outlawed Catholic faith in her private chapel Loud and bitter were the protests of Knox, and Mary humbled herself in repeated interviews with the stern reformer

Knox, flint like towards blandishments and arguments alike, left her weeping tears of impotent anger So began a duel which ended only when the queen, as a result of her own criminal folly in marrying her husband's murderer, had fallen from her high estate and become a fugitive and a prisoner and, in the end, a martyr in England

After preaching the coronation sermon of Mary's baby son James, Knox retired from public life and died three years later

Koala. This jolly little animal is the real original of the 'teddy bear,' and with his rotund figure, short legs, small ears, and snub nose, he looks exactly like the teddy bears you can buy in any toy shop At one time he was quite common in parts of Australia especially the south east, but persecution for his lovely warm coat has resulted in the reduction of his numbers so that he is protected by law His favourite home is away up in the tops of the tall eucalyptus trees, where he eats the sweet young buds and shoots His flesh

was formerly considered rather good to eat, but it was for his fur that he was chiefly hunted It is very soft and warm, and of a pleasing grey or brown colour

The koala, whose scientific name is *Phascolarctus cinereus*—Australians call him "native bear"—is a member of the great group of animals called marsupials, all of which have a pouch in which the young live for weeks after birth The kangaroo and opossum are the two best known members of this group (See Marsupials)

Koran'. This word means "the Reading," or "book to be read" On the sacred book called the Koran is founded the religion of about 225,000,000 Mahomedans or followers of the prophet Mahomet It is used in public worship, is the chief textbook in Mahomedan

schools, and is the standard of all law and practice among devout Mussulmans

The Koran is regarded by the Moslems ("the faithful") as the word of God revealed to the prophet Mahomet, principally through an angel "Gabriel" Its various parts were written down from the prophet's lips, from time to time, by the prophet's scribes, on dried leaves, bits of leather, whitened shoulder-blades of sheep, or whatever else was at hand A few days after the death of Mahomet these fragments were copied on paper, during the caliphate of Abu-Bekr and later, copies were distributed

The Koran, which is written in Arabic, is about as long as the New Testament, and is divided



KOALA, THE REAL 'TEDDY BEAR'

Surely there can be no doubt what these animals are they are the nursery teddy bears come to life! Actually, they are koalas, curious little members of the marsupial group in Australia They are also called 'tree bears' from their climbing habits illustrated here
Australian National Travel Association

into 114 *suras*, or chapters. Each of these begins, "In the name of God, the merciful and compassionate." The book consists of history, legends, prophecies, moral precepts, and laws. The histories are chiefly about Old Testament characters, and many of the doctrines and laws are the same as those of Judaism or of Christianity. Moses, Jesus, and Mahomet are named as the greatest of the line of prophets sent by God to lead mankind in the path of truth.

The fundamental doctrine is the oneness of God, expressed in the simple statement, "There is no God but God (Allah)", and submission to His will (Islam) is the highest virtue. Much emphasis is laid also on the Last Judgement, when everyone shall receive reward or punishment for his deeds. The faithful Moslem is commanded to pray five times a day, turning his face toward Mecca, to fast in the month of Ramadan, to give alms, and to make at least one pilgrimage in his lifetime to Mecca, the sacred city, if his financial circumstances allow him to do so. Both the civil and criminal laws of Mahomedanism are based on teachings of the Koran. The Koran is regarded with the utmost reverence by Mahomedans. (See Mahomet)

Korea. (Pron ko-rē'-a) "If men cannot put their heads together they cannot conspire." So thought an ancient ruler of Korea—or Chosen, as it is officially called by the Japanese, meaning "land of morning calm." And forthwith he proceeded to stamp out conspiracy by making his subjects wear hats so big that they had to shout to one another! Fanciful as this story is, the fact remains that even now, when Korea has become a province of the Japanese Empire, it is "the land of hats"—hats of enormous size and infinite variety, each kind having its own significance.

You may still see the peasant, in short white jacket, loose baggy trousers tied at the ankle, wadded socks, and wooden boat shaped slippers, wearing an enormous white straw hat sloping out over his shoulders like a tent. The Korean gentleman, carrying a parasol of oiled paper, struts about in a long flowing kimono, and wears a stiff hat of glossy black horsehair or split bamboo, sometimes tied with ribbon under the chin. In former days the single men were not allowed hats, and had to wear their hair in braided queues down their back, but if a man were engaged to be married he was allowed, as a compromise, a hat of yellow straw.

But much of this old picturesque Korea has now disappeared, along with the hermit-like seclusion, the ignorance of the rest of the world, the

disease and bad sanitation that ruled before the land was formally annexed to Japan. Railways, telegraphs, improved harbours, new agricultural methods, scientific stockbreeding, schools of silk-culture, an improved educational system, and better hospitals—these are marks of the revolutionizing energy with which Japan is now seeking to remake Korea, as she herself was remade in the second half of the 19th century. In every way material progress under Japanese rule has been great. But the nationalistic sentiment, with the cry "Korea for the Koreans," became formidable in the years following the World War, despite the stern hand with which Japan put down conspiracies and revolutionary attempts.

Korea is a rather mountainous country, less than half of it being under cultivation. It is a peninsula, thrusting south from Manchukuo between the Sea of Japan and the Yellow Sea. In the wild bleak north rise richly timbered mountains, 4,000 to 8,000 feet high. Here prowl man-eating tigers, while other wild animals roam the wooded zigzag mountain range which stretches south along the peninsula.

To the west this range throws off a chaos of spurs with steep-sided valleys—a rich region filled with flooded fields of rice and plantations of tobacco, cotton, hemp, peas, soya beans, grains, and ginseng. Here you see the oddly garbed natives, who are of mixed Mongolian and Malayan descent, tilling the soil, often with crude wooden ploughs drawn by oxen, and the big native water hammer, for pounding grain, rising and falling like a thing of life. It is a mere log whose hollowed end is so balanced under a stream that the water alone operates it.

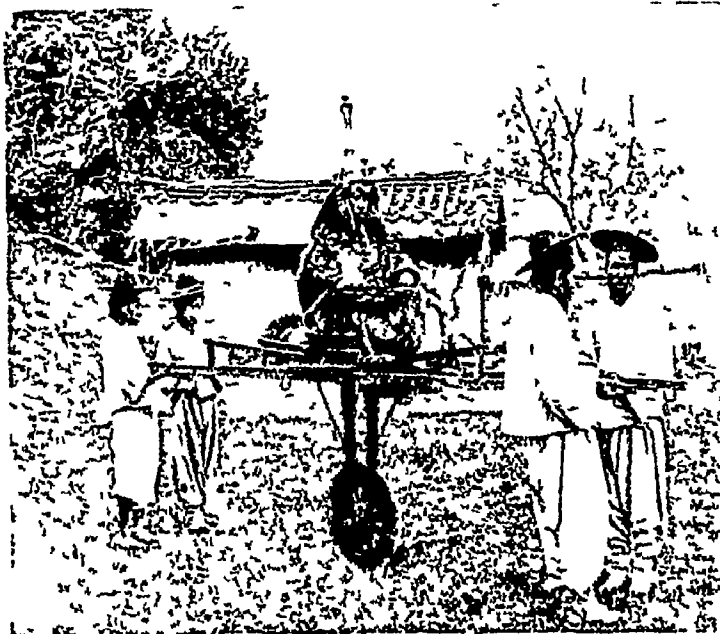
You pass many walled villages, whose one-storeyed mud huts thatched with white straw look like fields of mushrooms. You are astonished to find that the Koreans long ago anticipated our hot-air furnace and central heating, for fire is built at one end of each hut for cooking, and the heat is carried under the house through pipes and flues to the chimney at the other end.

The inland walled city of Seoul (Keijo fu), the capital, is a place of strange contrasts—of red-roofed mud huts and splendid modern buildings. Tram-cars clang past vendors squatting in front of their shops and porters with huge burdens.

But Korea's national life extends more than 3,000 years into the past. It early developed its own arts, as well as a literature written almost

entirely in Chinese. Printing by means of movable metal types existed in Korea in the 15th century, and one of their admirals in the 16th century invented an iron-clad ship moved by oars.

Area—85,000 square miles, including over 1,000 small islands. *Population*, 22,000,000.
Physical Features—A mountainous peninsula, with many deep river valleys to the west of the main range.
Principal Products—Rice, barley, wheat, and other cereals, silk, gold and other minerals.
Chief Cities—Seoul, capital (394,500), Pusan (163,800), Pyeng-Yang (159,000).



PICTURES OF LIFE IN KOREA

Above is a palanquin which travels on its single wheel on smooth ground, and is carried over rough ground. The photograph at top right of a Korean woman in full dress, shows her wonderful sash, while the one below shows an outdoor stove from which heat is carried into the house by a channel.

Photos left Will Taylor bottom Doris L. Igh

In the 14th century Korea was tributary to China, and in 1592 Japan invaded the country. The Russian attempt to dominate Korea was the cause of the Russo-Japanese War of 1904-5, which ended by Russia recognizing Japan's paramount interest in Korea. The Japanese formally annexed Korea in 1910.

Coarse cotton and silk cloth, bamboo screens, inlaid ware, and pottery are manufactured, and mats of fabric are woven from hemp and grass. The land yields gold, copper, coal, iron, etc.

Kosciusko, TADEUSZ (Pron kos yus' ko) (1746-1817) Like Lafayette, this gallant Polish general and patriot won fame as a champion of freedom on two continents.

An unhappy love affair led him when a young captain of artillery, in 1777, to leave Poland and offer his sword to the new republic across the Atlantic, and there he served with distinction as an engineer in the War of Independence.

Unhappy Poland meanwhile was succumbing to aggression and anarchy. Kosciusko returned in time to fight valiantly but unsuccessfully at Dubienka and elsewhere (1792) against the Russian invasion which preceded the second partition (1793). When the great popular uprising broke out in March, 1794, Kosciusko became dictator and commander in chief.

His victory at Racławice, won in part by peasant forces, breathed new life into the Polish nation. His engineering skill successfully defended Warsaw against siege by the combined Russian and Prussian armies. But the defeat of



his army of 7,000 Poles by 16,000 Russians at Maciejowice (October 10, 1794), ended Poland's chance of withstanding her powerful neighbours.

Taken a prisoner, Kosciusko was released by the Emperor Paul in 1796, and visited England, France, and America. His remaining years were spent in Switzerland, where he was killed through his horse falling over a precipice on October 15, 1817.

Kossuth, LOUIS (Pron. kos' oot) (1802-1894) This brilliant Hungarian lawyer, fiery orator, and Liberal journalist was condemned in 1837 to four years' imprisonment for plotting against the house of Hapsburg.

From the study of the Bible and Shakespeare during his confinement he gained a wonderful knowledge of the English language. Then, in the Hungarian Diet, his advocacy of freedom

of the press and abolition of all feudal privileges made him the chief leader of the Liberals in the Hungarian part of the Austrian Empire

Kossuth, now practically dictator in Hungary, advanced to a formal declaration (April 14, 1849) that the Hapsburg house, "perjured in the sight of God and Man, had forfeited the Hungarian throne." But his rashness and egotism alienated other Hungarian leaders, while his assertion of Magyar rights led the South Slavs to join with their Austrian masters. The revolution in Hungary, however, was put down only by the aid of a Russian army sent by the Tsar (June-August, 1849).

Kossuth was now compelled to flee into Turkey for refuge. Austria and Russia demanded that he should be given up for execution, but England prevailed on the Turkish government to refuse. In England he was greeted with an enthusiasm similar to that which had welcomed Giuseppe Garibaldi ten years before.

He remained in England for the greater part of the next 17 years. When his rival Deak brought about the reconciliation of Hungary with the Hapsburg dynasty (1867), Kossuth, then in Italy, refused to avail himself of the general amnesty to return to his native land.

He remained in Turin, and he died in that Italian city on March 20, 1894.

Kyōto, JAPAN For more than a thousand years Kyoto (Kioto) was the political, intellectual, and artistic centre of the Mikado's empire, and it justly lays claim to the title of "the Rome of Japan." Rich in history and legend, a city of ancient temples, beautiful palaces, and rare treasures of art, Kyoto epitomizes all that is most admirable and interesting in old Japanese civilization.

The natural surroundings are a fitting frame for a city devoted to art. Wooded hills, perennially green, encircle it, and the river Kamogawa, for the greater part of the year little more than a rivulet, meanders through its midst. Tucked away under the shelter of the

hill-sides are picturesque Buddhist and Shinto monasteries, shrines, and pagodas. On the sunny lower slopes are the country estates of wealthy Japanese, surrounded by beautiful gardens, persimmon orchards, and tea plantations.

Kyoto tea is considered the finest grown in the empire. Indeed, it is thought to be far too good for export, so practically the whole crop is consumed by the Japanese themselves. In early summer, when the first green tea leaves

are being gathered, the suburbs of Kyoto present a very lively scene. The work must all be done by hand, and every available man, woman, and child is called in to take part in it.

In the manufacture of pottery, bronze, and ivory wares, of cloisonné, damascene (see Japanese Art), and silk, Kyoto surpasses all other cities in Japan. Indeed, all art fashions may be said to originate in Kyoto, where the custom still prevails of handing down from father to son the secret processes of expert handicraft. So here are manufactured much of the porcelain, embroidery, brocades, fans, and dyed silks, as well as modern toys, that are so popular in Europe and America.

Kyoto is still the goal of devout pilgrims from all parts of the empire. Within its borders are nearly a thousand tem-

ples and shrines, many of which appear in the most unexpected places—in the heart of the business districts, in Theatre Street, and in secluded gardens. As it has been the dwelling-place of many Mikados, all of Kyoto's greater temples are palatial.

Fires have repeatedly devastated the city, but each time it has been rebuilt. During the Middle Ages, when Kyoto enjoyed its greatest prestige, the population is estimated to have been nearly a million. But as Tokyo (the northern capital) grew, Kyoto declined in size and importance, and, finally, in 1868, the court was moved to the northern metropolis. Today the population of Kyoto numbers over 1,000,000, although its industries are not of the sort which can be expected to bring about rapid growth.



BEAUTY SPOT OF KYOTO

These highly-ornamented gables are a part of the famous Kiyomizu-Dera temples which stand on a hill above Kyoto. The temples are surrounded with pine trees and cherry trees, and are seen at their best when the cherry blossom is out, when the people of Kyoto flock to them on holidays.

Photo by Wimbleton Hill

